



Society of Petroleum Engineers

Style Guide

August 2019 Revision

SPE Style Guide 2019 Revision List

Welcome to the 2019 revision of the SPE Style Guide. The primary goal of this revision was to better organize the information in the guide for ease of use, while reducing redundancy. To this end, the guide has been reformatted into five main parts, with applicable subsections and appendices, rather than a continuous listing of interconnected sections. Reformatting comprises the majority of the change to the guide; the following is a listing of additional changes made during revision.

1. **Complex sentences:** Recommended sentence length changed from 25 words to 15–20 words.
2. **Abbreviations:** Limit the use of abbreviations to those used five or more times.
3. **Jargon:** Specialized terms must be defined at first use with a note that the term will be used throughout the rest of the publication.
4. **Units of Measure:**
 - a. When using the degree sign (°), only include a space between the value and degree sign for units of API gravity.
 - b. Use “cm³” in place of “mL” to express volume (capacity).
5. **Titles and Headings:** Removed the stipulation that any word of four or more letters should be capitalized.
6. **Bylines:** Added a note regarding use of first and middle initials vs. full names in bylines.
7. **Enumeration of Points:** Emphasized that numbered or bulleted lists in the Conclusions section of a paper are formatted flush to the left margin, not indented.
8. **Nomenclature:** Note added that if an author chooses to omit the Nomenclature, SPE requires that all symbols used in the paper be defined clearly with dimensions and units (as applicable) at first mention in the text.
9. **References:**
 - a. Updated the digital object identifier (DOI) information to reflect the new standard <https://doi.org/>.
 - b. Added rules for alphabetical listing of references.
 - c. Added Appendix G: SPE Reference Style Examples.
10. **Appendices:** Section 2.7 was added to clarify use of appendices in journal papers.
11. **Author Biographies:**
 - a. Removed prior work history, publications/patents, and SPE service from the required information for an author biography.
 - b. Added SPE membership.
 - c. Changed styling of specific job titles or generalized job duties.
12. **Common Errors in Usage/Grammar:**
 - a. Added use of “a, an” with acronyms.
 - b. Added use of “alternate, alternative.”
 - c. Added use of “definite, definitive.”
 - d. Added use of “disk, disc.”
 - e. Updated use of “due to.”
 - f. Added use of “impact.”
 - g. Added use of “innate, inherent.”
 - h. Added use of “on, upon.”
 - i. Added use of “turbid, turgid, torpid.”

13. Punctuation:

- a. Removed redundant examples of forming possessives by use of apostrophe.
- b. Added a note that there is no space between an em dash and the words or numbers on either side of it.
- c. Added a note that there is no space between an en dash and the words or numbers on either side of it.
- d. Removed bullet regarding use of a hyphen after any prefix if omitting the hyphen will convey the wrong meaning.

14. **Geographic:** Removed the list of cities that can stand alone in text. Moving forward, all cities should include state/country designations.

15. **Trademarks:** Emphasize that if use of a trademark is used, ownership of the trademark should be acknowledged in a reference or parenthetical insertion.

16. Policies and Guidelines:

- a. Added Section 5.1: Commercialism.
- b. Added Section 5.2: Use of Copyrighted Material.
- c. Added Section 5.3: Plagiarism.

17. Style Guide Appendices:

- a. Removed “Christmas tree” from Appendix A: Oil-Industry terms.
- b. List of organizations moved to Appendix C.
- c. List of corporate suffixes moved to Appendix C.
- d. List of reference styles and formatting moved to Appendix G.

Foreword

The Society of Petroleum Engineers (SPE) produces print and electronic publications and marketing materials that are distributed to engineers and others in the oil and gas industry worldwide. Because SPE disseminates technical information for a worldwide readership, clear writing is essential to enhance the comprehension of SPE publications by readers from a number of geographic areas, nationalities, and language backgrounds.

SPE's rules of style are intended to promote clarity, conciseness, accuracy, and consistency in the society's publications. Guidelines on customary abbreviations, numbering, nomenclatures and reference lists, and punctuation are included in this guide. The *Chicago Manual of Style*, 17th edition, may also be a helpful reference.

While SPE believes that many others may find the guidance in this document helpful, other publications or applications may have somewhat different needs that require some differences in style. SPE's objective in making this style guide available is to help authors and others understand the style that SPE uses in its publications. It is not SPE's intention to try to establish a style that is broadly applicable across the oil and gas industry; rather, the intent is to define how SPE will treat style questions in its own publications.

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PART I: STYLE AND USAGE

Section 1.1: Writing a Good Technical Paper

- Use **active voice** rather than passive voice to produce clearer, more concise writing.

Passive voice: An improved method was recommended by the authors.
Results of the five experiments are in Fig. 2.

Active voice: The authors recommend an improved method.
Fig. 2 shows results of the five experiments.

- **Minimize the use of long, complex sentences.** Most technical writing experts recommend an average sentence length of approximately 15 to 20 words. A mix of long and short sentences and a varied sentence structure are most readable.
- **Limit the use of abbreviations.** Use abbreviations sparingly. Limit the use of abbreviations to those used often in the article, generally five or more times. Do not abbreviate terms used only once.
 - When an abbreviation is used, spell out the term at first use, place the abbreviation in parentheses after it, and then use the abbreviation in the remainder of the paper or chapter.
 - In journal papers and at the author's discretion, spell out the abbreviated term again if used as the title of a section or subsection, or in a figure or table caption.
 - In books, spell out the term at its first use in each chapter; then, continue use of the abbreviation throughout the remainder of the chapter.

Note: Rules on the use of abbreviations appear in Section 2. Common oil-industry terms and common oil-industry abbreviations can be found in Appendices A and B, and a list of common organizations and company abbreviations can be found in Appendix C.

- **Write concisely.** Avoid repeating information. Eliminate unnecessary words and flowery language. A short word is often preferable to a longer word or phrase with the same meaning.
- **Avoid jargon.** The specialized term used for an object, place, or method in your geographic area or discipline might not be common elsewhere. Use the commonly accepted name or word rather than local industry jargon. If a specialized term is used, define it at first use and note that the term will be used throughout the remainder of the publication.

Section 1.2: Spelling

1.2.1 Compound Words

In the growing vocabulary of the industry, many verb/adverb or verb/preposition combinations are combined into one word. They should be written as two words when used as verbs. For example, *workover* well vs. *to work over* the well, at *breakthrough* vs. *water will break through*, and *buildup* pressure vs. *pressure can build up*. Additionally, certain compounds formed by two nouns should be written as one word when combined to form an adjective (e.g., *casinghead* gas vs. the *casing head*, *oilfield* problems vs. an *oil field*, and *oilwell* tools vs. the *oil well*).

1.2.2 Latin Words

A number of words in English take the Latin plural form.

analyses	indices	strata	data	appendices
vortices	media	radii	criteria	phenomena

1.3.3 British vs. US Spellings

US spelling conventions are followed for SPE periodicals, books, and most other materials. Paper titles for all SPE event programs and proceedings follow whichever English spelling convention the author elects to use. Programs and other promotional materials prepared for events organized by SPE offices in Dubai, Kuala Lumpur, London, and Moscow (and for most events held in Europe, the Middle East, the Indian subcontinent, Africa, and the Asia Pacific region) follow British spelling conventions. SPE events organized from the SPE office in Dallas follow US spelling conventions. All program material, regardless of the responsible office, should be consistent throughout.

1.2.4 Oil-Industry Terms

Preferred spellings of common oil-industry terms, except as noted in Section 1.2.3, are listed in Appendix A.

Note: With “*fracturing*” appearing commonly in mass media, many news organizations use the verb “*fracking*.” However, SPE style uses this only when directly quoting someone else; in all other cases the word “*fracturing*” is spelled out.

Section 1.3: Abbreviations

- Abbreviate academic and honorary degrees without periods or spaces. The word “degree” should follow the abbreviation (e.g., PhD degree or MS degree), though it is not necessary in all cases (e.g., MBA).
- Abbreviate the names of societies and government agencies without periods or spaces (e.g., SPE, IADC, SPWLA, NPF).
- Use the following abbreviations for the listed major political entities. Unlike other abbreviations, there is no need to spell out the full name of the political entity at first use.

UAE for United Arab Emirates

US for United States of America (Use USA only when listing a full location, such as Austin, Texas, USA.)

UK for United Kingdom

EU for European Union

- Abbreviate and capitalize “equation” and “figure” when followed by a number or designating letter (e.g., Eq. 5, Fig. 6). Capitalize but do not abbreviate “table,” “appendix,” “column,” or “section” when followed by a number or designating letter (e.g., Table 1, Appendix A, Column 2, Section 4.1), and do not capitalize or abbreviate “page.” Abbreviate and capitalize “number” when it is part of the proper name of a well (e.g., No. 4), but omit the word in other cases (e.g., Sample 3). Do not use a hashtag symbol (#) as an abbreviation for “number.”
- With regard to acronyms, leave them all uppercase if they are “true” acronyms, in which each letter stands for an actual word. “False” acronyms are brought into downstyle (i.e., uppercase first letter only).

True Acronym: BOM—bill of materials

False Acronym: ANACO—analysis of core logs report

- Many programming languages, some software applications, and a few other products have their names trademarked in all capital letters and are exceptions to the “true” acronyms rule; if the name is a trade name, capitalize the entire name—or the indicated portion of it—according to the trademarked style (e.g., BASIC, Macintosh OS, COBOL, QuarkXPress, FORTRAN, UNIX).

Section 1.4: Units of Measure

- Use only customary (i.e., English system) units or only SI units; do not mix.

Exception: Pipe sizes can always be expressed in inches, even if the rest of the text uses metric units.

- Abbreviate units of measurement in the text only when used with numerical values (unless the abbreviation replaces a very long phrase, such as “several scf/D” for “several standard cubic feet per day”). A list of preferred abbreviations for oilfield units appears in Appendix D. Consult the *SPE Metric Standard* for a complete listing of preferred SI units.

Examples: 25 ft 103 ft³/D 10 gal 3 cm³

Note: *Always abbreviate such units in figures and tables.*

- Do not add “s” to abbreviated forms of plural units of measure; use the same abbreviation for both singular and plural forms (e.g., 10 bbl, not 10 bbls). Add the “s” when the unit is spelled out (e.g., darcy/darcies, day/days, ton/tons, and mile/miles).

Example: In the experiment, the mass was measured in tons.

- For units of time in combined units, use the customary abbreviations “sec” (second); “min” (minute); “hr” (hour); “D” (day); and “yr” (year) or the metric abbreviations “s” (second); “min” (minute); “h” (hour); “d” (day); and “a” (year). Otherwise, spell out the term.

Examples: 42 m/h, but 42 hours 34 ft/D, but 34 days 12 gal/min, but 12 minutes

- Use abbreviations instead of “ciphers” or symbols to represent customary units of measurement.

Examples: Use “lbm” or “lbf,” not a hashtag (#).

Use “in.,” not a quote mark (”).

Use “ft.,” not an apostrophe (’).

- Express percentages with the percent symbol (%), with no space between the value and the symbol (e.g., 25%, 12 mass%, 21 vol%, 17 mol%, 13 wt%).
- Use the degree symbol (°) with angles, temperatures [except for metric K (Kelvin)], and compass coordinates (e.g., 20° slope, 65°F, 2°W). Only include a space between the value and the degree sign for units of API gravity (e.g., 30 °API).

- Use the slash (/) in place of “per” between two abbreviated units of measurement (e.g., 40 psi/ft, 15 cm/s, 40 lbm/ft).

Exceptions: Shots/ft is spelled out at first use, followed by (spf) to indicate its abbreviated form in further uses.

BLPD, BOPD, BFPD, BWPD are exceptions that allow the use of “P” for “per.”

- Use the hyphen (-) in customary units (e.g., md-ft, B/D-psi) and the product dot (·) in metric units (e.g., md·m, m³/d·kPa) to indicate multiplication in combined units.
- Use “lbm” for pounds mass and “lbf” for pounds force.
- Use “cm³,” not “cc,” for cubic centimeter.
- Use “cm³” in place of “mL” to express volume (capacity).
- Use abbreviations MM for million and M for thousand ONLY with cubic feet to express gas volumes. Avoid the use of MM with such expressions as barrels of oil (MMBO) or barrel of oil equivalent (MMBOE); instead, spell out “million.”

PART 2: ELEMENTS OF TECHNICAL PAPERS

All technical papers will have some, if not all, of the following elements.

- Title
- Byline
- Body
- Nomenclature (contingent)
- Acknowledgments (optional)
- References
- Appendices (as necessary)
- SI Conversion Factors
- Author Biographies
- Figures
- Tables

Section 2.1: Titles and Headings

- In titles and headings in SPE literature, capitalize nouns, pronouns, and adverbs. Also capitalize “no,” “nor,” “off,” “out,” “so,” and “up.” Capitalize words of fewer than four letters if they are a verb or part of or closely connected to a verb (e.g., Held Up, To Inject, Can Be Produced).
- Capitalize both parts of a compound adjective (e.g., Two-Phase, In-Situ, Full-Sized).
- Use a colon (preferred for titles) or an em dash (acceptable for headings), rather than a comma, to set off part of the title; capitalize the first word after the colon or em dash, and then capitalize as detailed previously.

Examples: Corrosive Service: A Study in Economics
Horizontal Drilling—New Horizons

Section 2.2: Bylines

- Bylines on technical papers should include the name of each author, followed by company affiliation.

Example: J. B. Brown, Consolidated Flange; P. D. Smith, Smith Consulting; and E. L. White, Worldwide Washers

Note: As shown in the above example, use of an author’s first and second initial with full last name is preferred in bylines. However, the spelling of an author’s name in a byline should reflect the author’s preference, meaning that full first names can be used instead of first initial.

- If two or more authors in a row have the same company affiliation, do not repeat it after each name.

Example: J. B. Brown, Consolidated Flange; P. D. Smith, Smith Consulting; and E. L. White and P. Lane, Worldwide Washers

- Do not rearrange the names of authors in order to simplify or shorten a paper’s author line. The order of authors as listed in a technical paper is important; do not change it to simplify company references.

Example: **J. B. Brown**, Consolidated Flange; **P. D. Smith**, Smith Consulting; **E. L. White**, Worldwide Washers; and **P. Lane**, Consolidated Flange

- If an author’s company affiliation changes during or after the writing of a paper, list the affiliation held during the writing of the paper after the author name with the new affiliation following as a footnote.

Example: **Penny Lane**^{*}, Worldwide Washers
 ^{*}now with Consolidated Flange

- Include corporate suffixes in author bylines, as well as bios, if provided. See Appendix C for a list of common abbreviations for these suffixes.

- Punctuate bylines properly to avoid confusion of credit or affiliation. Below are examples of different byline constructions with correct punctuation.

- *Two people, one company:* No comma before the “and.”

J. Ford and **T. Gibson**, Exxon Mobil Corp.

- *Two people, two companies:* Comma before the “and.”

J. Ford, Exxon Mobil Corp., and **B. Smith**, Schlumberger

- *Three people, three companies:* Semicolons to separate, and semicolon before the “and.”

J. Ford, Exxon Mobil Corp.; **B. Smith**, Schlumberger; and **K. Moore**, BP

- *X people, two companies:* commas to separate, and comma before the “and.”

J. Ford, **T. Gibson**, and **S. Johnson**, Exxon Mobil Corp., and **K. Moore** and **J. Foster**, BP

- *X people, three or more companies:* semicolons to separate, and semicolon before the “and.”

J. Ford and **T. Gibson**, Exxon Mobil Corp.; **J. Foster**, BP; **B. Smith**, Schlumberger; and **G. White**, **C. Jones**, and **S. Kennedy**, B&R Consulting.

- When possible, write a person’s name as he/she writes it. Be aware that the order of names (family name, given name, etc.) is different in different cultures. Always consider the author’s preference.
- Do not use department names or university locations in author listings on technical papers. Use the name of the college or university only (which may include a location to differentiate it from another branch of the school).

Example: **O. Jordan**, Texas A&M University; **J. Simpson**, University of Tulsa; and **Mahmoud Ali**, Texas A&M University-Qatar.

Section 2.3: Body

2.3.1 Typeface

- Use bold typeface for such things as authors' names in bylines and on first use in author biographies; section headings in articles; and first mention of figures and tables.

Example: **A. C. Clarke**, Monolith Communications, and **I. Asimov**, US Robotics.

Example: **Arthur C. Clarke** is the author of *2001: A Space Odyssey* and many other books. Clarke holds a PhD in astronomy from Oxford University and is credited with inventing the concept of the communications satellite.

Isaac Asimov is the author of more than 500 books, many about robots; he is even credited with having coined the word “robotics.” He holds a PhD in biochemistry from Columbia University.

Example: Note trends shown in **Fig. 1**.

- In most situations, any punctuation accompanying a boldface citation is set in bold as well.
 - When citing a figure for the first time and that citation happens to be in parentheses, bold both the figure number and the parentheses, along with any punctuation that immediately follows the parentheses (**Fig. 2**).
 - If a figure is cited for the first time and is enclosed in parentheses along with additional text, then bold **ONLY** the figure designation, not the parentheses or any following punctuation (see data in **Fig. 3**).
 - Bold the first reference to a portion of a multipartite figure (**Fig. 1a**), but leave subsequent references to other parts in normal type (Fig. 1b).
- Use italic typeface for such things as species names; all periodical titles; and a number of mathematical elements.

Examples: In Europe, the pike, *Esox lucius*, is valued for food as well as sport.
SPE Journal has many fine articles, but those in the *National Enquirer* are a bit more entertaining.

- Use normal typeface for the majority of print in a paper. In a passage of italic type, any terms that would be set off in italics in normal type are converted to normal type for contrast.

Example: Wells, H. G. 1910. *Geological Absurdities in Journey to the Center of the Earth by Jules Verne*, 66–69. London: Gnome Press.

Also, certain technical terms are set in normal type, despite general rules that may apply to the contrary in some situations: M (for molar) and N (for normal), for example.

2.3.2 Enumeration of Points

- Avoid numbering items in a series of brief elements.

Example: The measured liquid production was a result of (1) external expansion, (2) liquid expansion, and (3) rock compaction.

Preferred: The measured liquid production was a result of external expansion, liquid expansion, and rock compaction.

- If the points listed have multiple parts that need separation by commas, use semicolons to separate the points.
- When points enumerated are more-complex, use a colon after the introductory sentence, and separate the clauses by semicolons. For consistency, if one point is a complete clause, all should be.

Example: The measured liquid production was a result of several factors: expansion of the system external to the core caused by...; expansion of the liquid contained in the pore spaces of the rock normally occurring when...; actual decrease in pore space caused by compaction within....

- When enumerating points in a bulleted list, introduce them with a sentence followed by a colon or period, or with a phrase without a colon or period. Indent bulleted lists by aligning runover lines with the first word following the number or bullet, and always start items with a capital letter. Whenever possible, be consistent in the use of complete or incomplete sentences. If bulleted lists contain at least one complete sentence, use a period also at the end of those that are merely a phrase or sentence fragment.

Examples: The steps you can take to protect yourself from identity theft are

- Destroy your private records and statements.
- Secure your mail.
- Safeguard your passwords.

As president of the society, Smith will emphasize

- Building support for young professionals
- Recruiting mentors from core industries
- Promoting sections to undergraduate students

- Numbering points is necessary only when the point is referenced later in the article or when the list is a stepwise process.

Example: The method specified in Point 3 could be used.

1. Determine the model parameters.
2. Gather the necessary information.
3. Enter the data gathered using the Wickersham method into the appropriate form.

Note: The Conclusions section of a paper commonly presents the final points as a numbered list, formatted flush to the left margin and according to the above guidelines.

2.3.3 Equations

- Equations are subject to the same rules of grammar as sentences. Maintain correct grammatical structure in sentences that contain, precede, or follow equations.
- The symbols for “equals” (=), “yields” (\rightarrow), and other such signs act as verbs. A complete list of mathematical symbols is available in Appendix E. Sentences containing these symbols must be grammatically correct.
- A complete sentence introducing an equation can end in a period or colon.

Example: In many cases, the relationship of motion can be expressed more simply.

$$A = Bx + (c - D_2). \dots\dots\dots(3)$$

Note: Take special care to avoid confusion. For example, “When $Ax = By$, C varies” is clearer when written as “When $Ax = By$, then C varies.”

- Indent and number each equation in the text. End equations with appropriate punctuation, followed by a dot leader that terminates at the equation number, which is in parentheses, on the right margin.
- Align subscripts and superscripts properly to avoid confusion about whether a symbol or number should be set on the line or as a subscript or superscript.
- Letter symbols should conform to SPE standard nomenclature (see Section 2.4.1). Define them in a formal nomenclature (in alphabetical order) at the end of the paper.
- When typing an equation on more than one line, break the equation at a complete term and start the next line with an operator sign. Indent the second and subsequent lines so that they align with the operator in the first line.

Example: $A_1 = 2B_2 + C(DF - DG)$
 $+ 2B_1 \times F_2. \dots\dots\dots(2)$

- Generally, use parenthetical pairs in the following order, proceeding from the inside of the equation outward: parentheses (), brackets [], and braces { }.

Example: $2\{[A(B + C/D) - E]2\} = 3F.$

- Angle brackets, vertical bars, and double vertical bars have their own mathematical significance; do not use them to supplement the sequence of common parenthetical pairs.
- In functional notation, use nested parenthetical pairs instead of braces to indicate grouping.

Example: $(f \cdot a \cdot b)(x) = f(a(b(x))).$

- Use braces to enclose the elements of a set.

Example: $\{1, 2, \dots, n\}$

- The proper notation for an equation in the text of the paper is the abbreviation “Eq.” The number of the equation does not appear in parentheses. The plural is “Eqs.”

Example: Eq. 7 illustrates this construct.

2.3.4 Citations

- Cite references in the text or in figure or table captions by placing the author’s last name and the year of publication in parentheses. If the author’s name is used in the text, include only the year of the reference in parentheses.

Examples: The generally accepted method (Smith 1990) offers several advantages.
 Smith (1990) provides a detailed explanation of this method.
 Fig. 2.7—Stresses acting on the borehole wall (after Aadnoy 1996).

- If the text cites more than one reference from the same author in the same year, add “a,” “b,” etc. to distinguish between the references. Separate references included in the same set of parentheses with semicolons.

Examples: Smith et al. (2004a, 2004b) showed that...
 The method is analyzed in several studies (Smith 1990; Jones and Smith 1992; Smith et al. 2004).
 This practice is common across the industry (Smith 1992, 1994b; Jones 1996).

- If the referenced source is of considerable length and more than one part of it is referenced in the current paper, the in-text citation may include original figure or page numbers for clarification.

Examples: Yousef (1956, Fig. 4) first described this effect several decades ago.
A different section of the same earlier work was dedicated to this phenomenon (Smith et al. 1997, 234–236).

- When citing standards in text, do not spell out the abbreviations [i.e., American Petroleum Institute (API) Recommended Practice (RP) 7G]. The abbreviated term is the actual name of the standard and should not be deconstructed.

Correct: *API SPEC 2F* (1981) defines this process.
The operating limits (*API RP 7G* 1989) are defined as...

Incorrect: *API Specification 2F* (1981) defines this process.
The operating limits (API 1989) are defined as...

2.3.5 Numbering Tables, Figures, and Equations

- Use Arabic numbers to label tables and figures; number them in order cited consecutively through the text and within appendices. Within each appendix, use Arabic numbers and the same letter designation as that of the appendix (Fig. A-1, A-2, etc.; Table B-1, B-2, etc.). Label two-part equations as Eq. 1a and Eq. 1b, or Eq. A-3a and Eq. A-3b. Do not label them as Eq. 1 and Eq. 1a, or Eq. A-3 and Eq. A-3a.
- Designate all illustrations and nontabular material by “Fig.” Do not use the words “chart,” “exhibit,” “graph,” or “photo” when naming a specific figure. When referring to distinct parts of a single figure, use lower-case letters (Fig. 2a, Fig. 2b, Fig. 2c, etc.).
- When citing two-part figures in text, use “Figs. 2a and 2b” rather than “Figs. 2a and b.”
- The first time you cite a figure or table in the text, put it in **boldface**. All subsequent citations of that figure or table should be in regular typeface.

Example: ...as shown in **Fig. 1**. Also note in Fig. 1 that the...

- However, if grouping a previously mentioned figure with another being mentioned for the first time, it is set in bold again.

Example: ...as indicated in **Fig. 1**. Further development is shown in **Figs. 1 through 4**.

2.3.6 Footnotes

If footnotes in body text are used, keep them as brief as possible and place them at the bottom of the page (or column for multicolumn format) in which the reference to them appears. Use an asterisk (*) for the first and a double asterisk (**) for the second. If there are more than two footnotes, use numbers or letters instead of asterisks.

Section 2.4: Symbols and Nomenclature

- Italicize letter symbols (including subscripts and superscripts) in the text, equations, tables, and figures. Do not italicize numerals (including subscripts and superscripts), mathematical abbreviations (log, sin, cos, etc.), capital Greek letters, or chemical symbols. Do not italicize portions of letter symbols that are abbreviations (such as “max” for maximum) or that correspond to proper names (such as subscript Re in Reynolds number, N_{Re}). For more details, please refer to the subscript definitions list in the *SPE Letter and Computer Symbols Standard*.
- Each symbol used in a paper should have a unique definition (i.e., the same symbol should not be used for two different things in the same paper or book chapter and the same definition should not be used for two different symbols).
- Symbols should consist of a one-letter kernel. Do not use multiple-letter symbols (e.g., *WOR* for water/oil ratio or Re_N for Reynolds number). Use subscripts and superscripts to differentiate between symbols with the same one-letter kernel.

2.4.1 Nomenclature

- At the end of the paper or book, include an alphabetical Nomenclature of all symbols used. The list should include the letter symbol, an accurate and concise definition, dimensions in which the quantity is measured, and the units of measure used in the paper.

Examples: p = pressure, m/Lt², psi
 μ = viscosity, m/Lt, cp

Note: *If the author chooses to omit the Nomenclature, then SPE requires that all symbols used in the paper be defined clearly with dimensions and units (as applicable) at first mention in the text.*

- Dimensions are mass (m), length (L), time (t), temperature (T), electrical charge (q), money (M), and amount (n). If using dual units throughout the paper, the second set of units should appear in brackets.

Examples: L = length, L, ft [m] ρ = density, m/L³, lbm/ft³ [kg/m³]

- Organize items in the Nomenclature as follows:
 1. List Roman alphabetical terms with lowercase versions presented first, followed by uppercase versions.
 2. List Greek alphabetical terms with lowercase versions presented first, followed by uppercase versions. (The Greek alphabet is in Appendix F.)
 3. Within these sets, alphabetize individual terms accordingly (e.g., p precedes p_c , which precedes p_{eff} , which precedes P ; likewise, Δ precedes Δp in the Greek section).

Common SPE Standard Symbols

A = area	L = length	T = temperature
B = formation volume factor	m = slope	v = velocity
C = concentration	N = dimensionless number	V = volume
d = diameter	p = pressure	Z = elevation
D = depth	P_c = capillary pressure	μ = viscosity
h = thickness	q = production rate	ρ = density
J = productivity index	r = radius	ϕ = porosity
k = permeability	S = saturation	
K = coefficient	t = time	

Section 2.5: Acknowledgments

This is an optional element, and offers the author(s) an opportunity to address supporters and/or contributors to the paper.

Section 2.6: References

SPE style uses an author/date format for referencing, similar but not identical to Chicago style. Include these elements (as applicable) in each reference:

- Author(s) names—last name, first initial, and middle initial
- Year of publication
- Title of work
- For books (as applicable): edition, volume, series, chapter, pages, name and location of publisher
- For journals or other periodicals (as applicable): name of publication, volume, issue, page numbers, publication date, paper number, DOI

- For conference papers (as applicable): name, location and date(s) of conference, type of presentation, paper number, DOI
- Compile references into a single list in alphabetical order as follows:
 - Alphabetize by first author’s last name.
 - When two or more references have identical first authors, alphabetize by single-author references first, then by coauthor last name, regardless of number of coauthors, for multiauthor references.
 - When two or more multiauthor references have identical first authors and publication year, add “a,” “b,” etc. after the year.
 - When two or more references have identical full authorship, list chronologically, beginning with the earliest publication year.
 - When two or more references have identical full authorship and publication year, add “a,” “b,” etc. after the year to distinguish between the references, and alphabetize by title.
 - If no author or editor is provided, alphabetize by title.
- Omit a reference entirely if the information provided is so vague that the reader could not locate the referenced information. Personal communications, nonspecific website addresses, and unpublished results are not acceptable references. If such a source is necessary to the text, cite it in a footnote and not in the reference list. Refer to Appendix G for examples of how to format commonly used reference types.
- List no more than three author names in a reference. If a reference has more than three authors, list only the first three authors followed by “et al.” No comma should be used between the third author’s last initial and “et al.”

Examples: Two authors: Smith, A. and Jones, B.
 Three authors: Smith, A., Jones, B., and Kent, C.
 More than three authors: Smith, A., Jones, B., Kent, C. et al.

- For papers published by SPE, always include the SPE-assigned paper number in the reference (e.g., SPE-123456-PA).
- Always include the digital object identifier (DOI) name associated with a reference, if one is available. Always write the DOI name as a hyperlink. Create DOI hyperlinks by adding <https://doi.org/> to the front of the DOI number. The DOI prefix for SPE papers is 10.2118.

Example: Reference DOI name 10.2118/123456-PA as <https://doi.org/10.2118/123456-PA>

SPE allows use of abbreviated forms of publication and organization names in the reference list. The following are the official abbreviations for SPE publications:

<i>Journal of Canadian Petroleum Technology</i>	<i>J Can Pet Technol</i>
<i>Journal of Petroleum Technology</i>	<i>J Pet Technol</i>
<i>Oil and Gas Facilities®</i>	<i>Oil and Gas Fac</i>
<i>SPE Drilling & Completion</i>	<i>SPE Drill & Compl</i>
<i>SPE Drilling Engineering</i>	<i>SPE Drill Eng</i>
<i>SPE Economics & Management</i>	<i>SPE Econ & Mgmt</i>
<i>SPE Formation Evaluation</i>	<i>SPE Form Eval</i>
<i>SPE Journal</i>	<i>SPE J.</i>
<i>SPE Production & Facilities</i>	<i>SPE Prod & Fac</i>
<i>SPE Production & Operations</i>	<i>SPE Prod & Oper</i>
<i>SPE Production Engineering</i>	<i>SPE Prod Eng</i>
<i>SPE Projects, Facilities & Construction</i>	<i>SPE Proj Fac & Const</i>
<i>SPE Reservoir Engineering</i>	<i>SPE Res Eng</i>
<i>SPE Reservoir Evaluation & Engineering</i>	<i>SPE Res Eval & Eng</i>

Section 2.7: Appendices

Appendices are provided at the author's discretion and follow standard SPE style and usage. In journal papers, appendices are placed after the References section. An appropriate heading is included for each appendix, and any numbering of equations, figures, or tables within an appendix includes the letter of that appendix (e.g., Eq. A-1, Fig. A-1, Table A-1).

Section 2.8: Conversion Factors

If only one system of units is used (customary or metric), then a conversion factor table must be included at the end of the article, paper, or book. The table should include conversion factors for all units used, including those used in figures and tables.

Note: Do not include a conversion factor table if using dual units for all units used in an article, paper, or book (including those in figures and tables).

SI Metric Conversion Factors

$$\text{bbl} \times 1.589\,873 \text{ E-01} = \text{m}^3$$

$$\text{ft} \times 3.048^* \text{ E-01} = \text{m}$$

$$\text{hp} \times 7.460\,43 \text{ E-01} = \text{kW}$$

* Conversion factor is exact.

Note: The SI Metric System of Units and SPE Metric Standard, the Society's official standard, is available on the SPE website, http://www.spe.org/authors/docs/metric_standard.pdf.

The following units apply in both the customary system and SI metrics and do not require conversion.

ampere	A	parts per million	ppm
capture unit	c.u.	porosity unit	p.u.
cubic centimeters	cm ³	revolutions per minute	rev/min
frequency	Hz	shots per foot	spf
gram	g	volt	V
liter	L	volume percent	vol%
micron (micrometer)	μm	watt	W
millidarcy	md	weight percent	wt%

Section 2.9: Author Biographies

A biographical paragraph for each author is located at the end of the body of the paper. Author biographies should appear in the same order as the authors are listed in the byline, and should contain the following elements, as applicable to the individual author, in the order listed here:

1. **Name and Affiliation.** Begin the biography by stating the full name of the author, followed by job title and company name. Bold the author's name only. Do not capitalize specific job titles or generalized job duties.

Examples: **Joe N. Johnstone** is a reservoir engineer with Depco in Houston.

Robert Jones is director, resource management at OGI Company in Norman, Oklahoma.

Use the author's last name or an appropriate pronoun in all subsequent references to the author after initial use of the full name in the opening line.

2. **Research Interests.** Provide the author’s main area of study or a brief list of research areas of interest.
3. **Academic Credentials.** The wording here is specific, using the verb “holds” for advanced degrees. Do not capitalize areas of study or academic disciplines.

Examples: Jones holds a BS degree in chemistry from Stanford University.
Smith holds a BS degree in physics from Hendrix College, an MSc degree in chemistry from Bristol University, and a PhD degree in geothermal engineering from Richland College.
Aziz holds MS and PhD degrees from the University of Southern South Dakota, both in petroleum engineering.

4. **SPE Membership.**

Section 2.10: Figures

- For papers submitted to a journal, group figures in order of citation at the end of the paper. See Appendix H for figure examples.
- Number figures with Arabic (not Roman) numerals in the order cited in the body of the paper or chapter. Label related figures or figure sections with a shared numeral and consecutive lowercase letters (e.g., Figs. 1a through 1d). In books, label figures using a combination of the chapter number, consecutive numerals, and consecutive lowercase letters as appropriate (e.g., Fig. 3.1 or Figs. 4.1a through 4.1d).
- Format images at a high resolution (at least 300 dpi) and design them to occupy either a single column (3.33 in.) or the full width of the page (6.83 in.).
- Use 8-point Arial or Helvetica in bold for axis titles and 8-point Helvetica or Arial for body copy inside figures (if any). Capitalize axis titles (see Section 2.1 for rules on capitalization of titles); within the figure, capitalize only the first word and any proper nouns used within phrases.
- Axis titles indicate quantity and unit, separated by parentheses, with the unit abbreviated where appropriate.

Examples: Time (years) NOT Time (yr)
Depth (m) NOT Depth (meters)

- Punctuate figure captions like sentences, and generally capitalize only the first word. Define in the figure caption any abbreviations used in the figure.
- Avoid using unfamiliar abbreviations in figures.

Section 2.11: Tables

- For papers submitted to a journal, group tables in order of citation at the end of the paper.
- Number tables with Arabic (not Roman) numerals in the order cited in the body of the paper.
- Make table captions and column headings as concise as possible. Punctuate table captions like sentences, and generally capitalize only the first word.
- For column headings that indicate quantity and unit, separate the unit with parentheses and abbreviate the unit as appropriate.

2.11.1 Table Formatting (see also Appendix I: Sample Tables)

- **Size:** Design tables to occupy either the width of one column (3.33 in./20 pi) or the full width of two columns (6.83 in./41 pi).
 - Choose table sizes with readability in mind. If the preferred one- and two-column widths make a table look awkward or difficult to read, use a width of 5 in. (30 pi) instead.
 - Extra-large tables, especially those meant for landscape view, might require special formatting on a case-by-case basis.
- **Font:** Use 8-point Arial or Helvetica for all captions, headings, and body copy. Use 6.5-point Arial or Helvetica for footnotes or other notes.
 - List table footnotes at the bottom of the table, under the main body of the table but before the table caption. Follow footnote-labeling guidelines as described in Section 2.3.6.
- **Text:**
 - Capitalize and center-align column headings. If the column data are left-aligned, however, then left-align the heading for that column also.
 - Capitalize only the first word and any proper nouns in row headings and set to either left- or center-alignment as appropriate.
 - For body copy within the table, capitalize only the first word and any proper nouns used in the data. Center-align body copy unless it is in paragraph format, in which case left-align with hanging indent for readability.
- **Caption:**
 - Add the table caption below the table as for a figure.
 - Format table captions in sentence case and with left-alignment. End the caption with a period. For papers, do not bold the caption. For books, do bold the caption.

PART 3: GRAMMAR AND PUNCTUATION

Section 3.1: Common Errors in Usage/Grammar

a, an	Use a before any word starting with a consonant sound; use an before any word starting with a vowel sound. Follow this rule when using an acronym that is pronounced as one word vs. an initialism in which each letter is sounded out (i.e., a FEED scheme vs. an SAGD well).
ability, capacity	Ability is the human power to do (the ability to balance on one foot); capacity is the ability to hold (low-capacity storage).
about	Do not use as a synonym for approximately ; use that word instead.
albeit	Use though
all of	Except with pronouns, the of is unneeded (e.g., “all the drill bits,” but “all of them”).
allow, enable	Allow means “to permit,” whether by letting something happen or by not preventing it from happening. Enable means actively making something happen or giving something the opportunity to happen.
alternate, alternative	Alternate means to substitute or take turns; alternative means one or the other; a choice.
among, between	Use among when referring to three or more and between when referring to two (e.g., “between Wells A and B”) or to reciprocal relationships shared by two or more (e.g., “unitization between the operators”).
apt, likely	Use apt to express a general tendency; use likely to express probability.
as	Often imprecise when used as a subordinate conjunction indicating cause. Sometimes used to mean while, when, because, or since ; choose the precise word.
assure, ensure, insure	Assure means “to encourage”; ensure means “to make certain.” Insure should be used when referring to underwriting a loss.
based on	The main noun in a sentence is “ based on ” the subordinate noun contained in the “based on” phrase. Correct: Based on poor results, our decision was to terminate the project. Incorrect: Based on poor results, we decided to terminate the project. (On the basis of should replace based on here.)
below	Do not use as a synonym for less than .

commence, initiate	Use begin or start .
compare to, compare with	Compare to implies resemblances between essentially different ideas or things; compare with implies contrasts between essentially similar ideas or things. Thus, waterflooding operations compare to gas lift operations; Well 1 production compares with that of Well 2.
complement, compliment	Complement means (1) fill up or make complete; (2) the quantity required to complete something (e.g., the personnel of a ship); or (3) one of two mutually completing parts. Compliment means praise or respect. Complimentary means without cost.
comprise	Means to embrace or to include . The whole comprises its parts. Comprised of is incorrect.
connote, denote	Connote is to imply; denote is to be explicit.
currently, presently	Currently means it is happening now. Presently means it will happen soon.
data	Takes a plural verb (The data show that...). Datum is singular.
definite, definitive	Definite is exact; definitive is conclusive.
different from	One thing differs from another; different than is grammatically incorrect. For example, “Life in the industry was different than what he had expected it to be” should be rewritten as “Life in the industry was different from what he had expected it to be.”
dilemma	Does not mean “a problem” but implies a choice between two unattractive alternatives.
disk, disc	Disk is the common spelling; disc is preferred for some industry-specific terms.
domestic	Use the country to indicate the origin, because domestic will differ depending on the location of the reader. For example, use US to designate items of American origin.
dramatic, drastic	Dramatic denotes attention-getting or extreme results, while drastic refers to rapid, violent, or severe actions.
due to	Interchangeable with “attributable to.” When used adverbially, it means because of . Replace with through, because of, caused by, resulting from , or owing to as necessary to improve clarity or avoid overuse.
due to the fact that	Use because .

effect, affect	Effect means result (noun) or to bring about (verb). Affect means to influence.
employed	Use used instead.
etc.	Means and so forth and should be used at the end of a list that makes clear exactly what kinds of other things are implied. Not correct when used at the end of a list introduced by “such as,” “for example,” or “e.g.”.
fact	Actual fact and true fact are redundant expressions. All facts are true and actual.
farther, further	Use farther when physical distance is implied, further when referring to time, quantity, or expansion.
graph	A graph (noun) is a drawing that exhibits a relationship. Use plotted (verb) when you mean to locate points or figures on a graph.
having	It is better to use with .
hopefully	Do not use as a floating adverb, as in “Hopefully, the results will prove to be positive,” in technical writing.
if, whether	If implies uncertainty; whether implies an alternative.
impact	Avoid using as a verb; use affect or influence instead.
imply, infer	Something suggested or indicated is implied ; something deduced from evidence is inferred . “A writer implies and a reader infers.”
innate, inherent	Innate refers to a trait that is noticeable from birth; inherent also refers to a natural trait, but does not require life (e.g., water is inherently wet).
in order to	Simply use to .
input	Use input as a noun. Replace with enter when used as a verb, as in “entering data into a computer.”
input well	Replace with injection well .
irregardless	Incorrect; use regardless .
knot	A knot is 1 nautical mile (6,076.1 ft or 1852 m) per hour. The expression knots per hour is redundant.
less, fewer	Less refers to quantity, fewer to number. “We used less cement and fewer truckloads.”
majority, minority	Use only when referring to numbers of things, not size.

minimal, minimum	Minimal refers to a small or very slight amount (of minimal interest); minimum references the least quantity assignable (the minimum temperature recorded).
mother	Use “source” (e.g., mother fluid should be source fluid).
none	Uses singular verb when meaning no one or not one .
on, upon	On is preferred; use upon when introducing an event or condition.
on line, online; off line, offline	When something is started up, it is said to be brought on line (two words); when being turned off, it is said to be taken off line (again, two words). In nearly all other instances, online and offline are adjectives used as single words only.
only	Only goes next to the word it modifies. “The standard is based on data from only one source.” The same rule applies to primarily, largely, principally, mainly, partly, and completely .
optimal, optimum	Optimal (adj.) denotes the best or most effective, while optimum (noun) indicates the amount or degree of effectiveness.
over	Use to mean above, across, or beyond the norm. Do not use as a substitute for more than or greater than .
principal, principle	Principal means first or foremost. Principle means a basic truth or determined course of action.
prior to	Use before .
proved, proven	Proved is the past tense of the verb <i>prove</i> , meaning to establish truth or validity. Proven is used as an adjective that is used directly before a noun, meaning verified, as in “a proven talent.” An exception is the phrase “proved reserves” (in which proved is an adjective), which has a long history of usage in the industry and is therefore considered acceptable.
seasons	Seasons of the year are not capitalized except in this construction: “Fall 1980.”
since	Implies passage of time; use because when meaning “the reason for.”
so as to	Use thereby .
subsequent to	Use after .
takes into account	Use accounts for .

that, which	That is the defining or restrictive pronoun; which is the nondefining or nonrestrictive pronoun. “The automobile that is out of gas is in the driveway,” tells which automobile. “The automobile, which is out of gas, is in the driveway,” adds a fact about the only automobile in question.
turbid, turgid, torpid under way, underway	Turbid means thick and opaque; turgid means swollen; and torpid means idle. Two words if referring to something being in motion or in progress (The vessel is under way to the Gulf). Use the one-word form underway only if describing actions performed while in motion (The vessel encountered rough seas while underway).
unique	Means without equal . There can be no degrees of uniqueness. Thus, almost unique, totally unique, partially unique , etc., are incorrect.
upscale	Use scale up as the verb form.
utilize, utilization	Use and usage are preferable.
very	In technical writing, often overused and imprecise: “The results are very significant.” To express how significant the results are, report the <i>p</i> -value.
via	Means by way of in a geographical sense; also means through the medium or agency of (i.e., by means of)
where, which	Where refers to physical location; which (generally preceded by a preposition) refers to other circumstances, such as condition. Depending on the sentence, the preposition may be different: at which, by which, in which, with which, etc. Incorrect: “There have been four studies where the results contradict these findings.” Correct: “There have been four studies in which the results contradict these findings.” By convention, where is used in mathematical expressions: “Suppose that $a = bq + r, \text{ where } 0 < r < b.$ ”
whose, of which	Use whose when referring to something owned or possessed by a person, company, or living creature. Use of which when referring to something possessed by or pertaining to a nonliving thing, as in, “The experiment, the results of which are widely accepted, has not been duplicated.”

Section 3.2: Punctuation

3.2.1 Comma

- In a series of three or more elements, use commas between each element and before the final conjunction.

Examples: ... papers by Rogers, Smith and Sloan, and Greenlee
 ... the effects of viscosity, flow rate, and porosity

- Use commas to set off states used with locations.

Example: The director arrived in Bakersfield, California, USA, last week.

- Use a comma to separate two coordinate adjectives that modify the same noun; however, do not use the comma when the adjectives depend on what follows. Use the comma when the adjectives are similar in meaning.

Examples: a dark red dye
 a dark red, commercial dye

Note: Commas are used correctly if they logically can be replaced by “and.”

3.2.2 Colon

- Use a colon after a complete sentence to introduce a formal list, examples, equations, or an additional statement.
- Do not insert a colon between a verb or preposition and its object(s).

Incorrect: The benefits of this practice were: timeliness and cost savings.

Correct: The data were time, volume, and depth.

- Use a colon to introduce a long, formal quotation.
- Use a colon to express a ratio between numbers; use a slash (/) to express a ratio with words (e.g., area/volume ratio).
- Capitalize a phrase after a colon if it is a full sentence. Do not capitalize a phrase after a colon if it is part of a list or is an incomplete thought.

3.2.3 Semicolon

- Use the semicolon to separate clauses not linked by a conjunction and to separate long, involved coordinate clauses.

Example: Drilling to such depths is rare; much of the technology is experimental and changing rapidly.

- Use the semicolon to divide elements in a series when any of the elements contains commas. This is common in paper bylines as well as Acknowledgment sections.

Example: Section officers are Jim Black, Chair; Susan Hall, Program Chair; and Bill Williams, Secretary.

- Organize material between semicolons around common elements.

Example: Committee members are Jim Black, chair, and Sam Smith, secretary, Tonka Oil Company; Directors Al Jones, PDQ Drilling Company, and Max Wentworth, Sherman Associates; and Joe Johnson, vice chair, Texas Tools.

Exception: The order of authors listed on a paper is important; it reflects their level of contribution to the paper. As a result, never reorder or regroup authors to simplify company lists.

- Use the semicolon before conjunctive adverbs such as “therefore,” “however,” “thus,” “moreover,” and “consequently.”

Example: The first test failed; consequently, we ran another.

Exception: “Whereas” should be preceded by a comma, never a semicolon.

3.2.4 Apostrophe

- Typeset in curly form, not straight and vertical or slanted like an accent.

Exception: For use on websites, apostrophes appear in straight form.

- Use the possessive form for informal measures involving time, space, and quantity (e.g., a day’s work, a dime’s worth, a yard’s length).

- Use the apostrophe alone to form the possessive of a plural noun ending in “s” (e.g., the wells’ total production). Use apostrophe + s (’s) to form the possessive of words not ending in “s” (e.g., the producer’s output).
- **DO NOT** use an apostrophe when forming the plural of numerals, letters, years, or abbreviations (e.g., the 1920s, all As, BHAs)
- Use apostrophe + s (’s) when forming the possessive of a full or abbreviated word.
Examples: Smith’s paper on hydraulic fracturing is highly rated.
 The US DOE’s latest study is a revealing one.

3.2.5 Parentheses

- Use parentheses to set off phrases that start with i.e. or e.g.
Example: When identifying members of a particular discipline (e.g., reservoir management, geology, completions)...
- Use brackets [] around a parenthetical phrase already containing parentheses.
Example: The difference was small [compared with the earlier study by Adams (1976)].

3.2.6 Quotation Marks

- Typeset in curly form (e.g., “like this”).
Exception: On websites, quotations are in straight form.
- In general, use quotation marks to cite exact phraseology from another source, and to set off titles when italics are not used.
- Use quotation marks at the opening of each paragraph and at the close of the final paragraph of a long quotation. If the quotation is to be set in contrasting type or to be indented from the rest of the copy, do not use quotation marks.
- Set commas and periods inside quotation marks. Other punctuation marks go inside the quotation marks only if they belong to the material quoted.

3.2.7 Dashes

- There are several kinds of dashes, differing from one another according to length. The main ones are the en and em dashes. The en dash (–) is half the length of an em dash (—) and longer than a hyphen (-).

- Use the em dash to denote a sudden break in thought that causes an abrupt change in sentence structure; a pair of em dashes often sets such an intrusive item apart from the sentence parenthetically.

Examples: Water and gas are consumed, forming a crystalline cage—resembling ice—in which gas molecules become trapped.

In several areas—especially where access to well disposal is controlled—water reuse is considered to have several advantages.

- Use an em dash in the caption of a figure or table after its designation.

Examples: Fig. 1—Cutaway drawing of a well.

Table 1—Field properties.

Note: There is no space between the em dash and the words or numbers on either side of it.

- Use the en dash to indicate continuing or inclusive numbers, such as in dates, times, or references (e.g., 1968–72, 10 a.m.–5 p.m., May–June 1967, pages 38–45, 3–5 March 2002, 13 May 1965–9 June 1966).

Note: There is no space between the en dash and the words or numbers on either side of it.

- Do not mix the use of the en dash in this manner with words, such as “between/and” or “from/to,” in expressing a range.

Correct: ...from 1968 to 1972...; ...1968–72...

Incorrect: ...from 1968–72...; ...between 1968–72...

Correct: ...between 10 a.m. and 5 p.m....; ...from 1000 to 1700....; ...10 a.m.–5 p.m....; 1300–1630

Incorrect: ...from 10 a.m.–5 p.m.; ...from 1400–1800...

- When the concluding date of an expression denoting a duration of time is in the unforeseeable future, the en dash is still used.

Example: North Texas area wells contributing information to the ongoing study include Crumley B-213 (1979–), McConnell C-124 (1979–1992), West B-246 (1979–), and Bruce A-317 (1979–1983).

3.2.8 Hyphenation

- Do not use hyphens to express a range. Instead, use the complete idiom; with dates, page numbers, and addresses, use the en dash (e.g., from 20 to 30%, NOT 20-30%).
- Hyphenate compound customary units of measurement (e.g., acre-ft, md-ft).
 - When an article precedes a unit of measurement that comes before a noun, hyphenate the unit of measurement. If there is no article, then do not hyphenate the unit of measurement.

Examples: It is a 75-lbm drill bit.

It is set at 75 ft true vertical depth.

- In most cases, do not hyphenate after ordinary prefixes:

coeducation	hydroelectric	electrochemical	interconnection
Midwestern	quasilegal	pseudosteady	multiphase
nonlinear	repressured	subsea	prestimulation
semilog	ultradeep	updip	

- Use a hyphen after a prefix when there is a repeated vowel (e.g., re-elect, pre-eminent, semi-insoluble). Exceptions are cooperate, coordinate, isooctane, and microorganism.
 - Use a hyphen when the prefix precedes a proper name (e.g., non-Newtonian, post-Ordovician).
- Hyphenate the following titles:

president-elect	vice-chairman	vice-consul
vice-presidential	co-owner	co-chair

Note: DO NOT hyphenate vice president or president pro tempore.

- Hyphenate expressions such as “*n*-pentane.” However, do not hyphenate ordinary chemical combinations used as modifiers (e.g., a sodium chloride solution) or chemical names with prefixes (e.g., hydroxyacetic acid).
- Do not use a hyphen between words to take the place of “and” or “or.” Instead, use a slash (e.g., oil/water interface, pressure/time plot, pressure/volume/temperature data, section/chapter news).
- Hyphenate numbers twenty-one through ninety-nine when written as text (e.g., thirty-third, forty-two, one hundred twenty-five).
- Use hyphens to avoid ambiguity.

Examples: the lower-production interval (interval producing a lower production than other intervals)
the lower production interval (interval of production that is physically lower than others)

- Use a hyphen when two or more words in their combined sense modify a noun (e.g., around-the-clock watch, in-situ combustion, five-spot flood, oil-in-place calculations, stock-tank oil, trial-and-error method, second-order equation, clay-containing fluid).
 - When two or more words follow the word they modify, they do not ordinarily require hyphens.

Examples: the well is shut in vs. shut-in well
combustion occurred in situ vs. in-situ combustion occurred

- Hyphenate adjective phrases formed by an adverb and a verb (e.g., a slow-moving front, the quick-drying cement).
- Do not hyphenate adverb/adjective combinations in which the adverb ends in “-ly” (e.g., regularly producing well, fully developed field).
 - Some other combinations also do not take hyphens (e.g., relative permeability, capillary pressure, gamma ray).

- Use the suspended (“floating”) hyphen for relating similar qualities.

Example: Establish the pressure- and temperature-dependent characteristics.

- “Fold” is a joined suffix unless formed with a hyphenated number or numeral (e.g., twofold, 100-fold, twenty-five-fold).
- Hyphenate compound compass directions when used to form one direction. Use a slash to represent “to” in a direction.

Examples: The wind blew from the north-northwest.
The fault ran northwest/northeast.

- Only break words and hyphenate them at the ends of the lines of right-margin-justified copy. Ragged-right-margin copy should not have word breaks.

3.2.9 Ampersands

SPE does not permit use of the ampersand (which substitutes for “and”) in most instances, including titles of SPE events. Exceptions include some abbreviations (such as E&P, R&D, and BS&W), as well as instances in which the ampersand appears in trade names and publication titles.

Examples: *SPE Res Eval & Eng*
 SPE Drilling & Completion
 Health, Safety, Security, Environment & Social Responsibility discipline area

3.2.10 Web-Related Items

- Most uses of the prefix “e” to denote computerized or electronic form are hyphenated and lowercase, such as in e-business and e-commerce. Exceptions are email and ebook.
 - Do not capitalize the e-prefix, even in a title or at the beginning of a sentence, unless it is part of copy that is already in all capital letters.

Examples: A Closer Look at e-Commerce
 e-business is looking better all the time.
 WELCOME TO THE E-ZONE!

- Do not hyphenate the e-prefix in the use of a trademarked name with this as its style.
- Web addresses are formatted in plain typeface, with no hyperlink (i.e., no underline or special color), and followed by a period if the Web address ends the sentence.

Example: You can find the site by searching for it at <http://www.webcrawler.com>.

Exception: Format digital object identifiers (DOIs) with the full URL according to guidelines issued by CrossRef for the use of DOIs (i.e., <https://doi.org/10.2118/114172-MS>).

PART 4: CAPITALIZATION, NUMBERS, AND OTHER RULES OF USAGE

Section 4.1: Names

4.1.1. People, Personal Titles, Degrees

- When possible, write a person’s name as that person writes it. Particularly observe preferences in the use of initials or given name, spelling of “Mc” and “Mac,” and capitalization of prefixes such as “de,” “da,” “du,” “le,” “van,” and “von.” When personal preferences cannot be determined, use two or more initials or, if only one given name is available, spell out the first name and capitalize all prefixes except “von” and “de.” When an author or speaker’s nickname is used, enclose it in parentheses at the first reference.

Examples: William L. Strong W. L. Strong
 William L. (Skipper) Strong Skipper Strong

- Capitalization and hyphenation of elements in Arabic names vary, and so should be presented according to the preference of the author or speaker. When personal preferences cannot be determined, join the Arabic definite articles **al** and **el** with a hyphen when the name is given in full (e.g., Rasheed al-Maraj). When the full name is not used, the definite article should have an initial capital and a hyphen (e.g., Al-Maraj). Always present elements such as **Bin**, **Ben**, **Ibn**, and **Abu** with an initial capital (e.g., Saleh Ibn Tariq al-Fulan).
- Do not use the titles **Mr.**, **Mrs.**, **Ms.**, **Miss**, **Prof.**, or **Dr.** Occasionally cultural norms will dictate the use of an honorific, particularly when an individual holds a higher state or political office, military rank, or religious distinction.
- Do not use commas to set off **II**, **III**, **Jr.**, or **Sr.** in names.

Example: Jim Wilson Jr. arrived on-site last week.

- In running text, capitalize and spell out formal titles such as **president**, **chair**, or **vice president** when they precede a name and the articles **the** or **a** are not used. All titles appearing after the person’s name should be lowercase. In program listings and headings, capitalize major words in titles, department names, etc.

Examples: President Jane Smith will host the events leading up to the conference.
 Events are hosted by the president of Acme, Jane Smith.
 Darcy Spady, who served as 2018 SPE president, is being honored with an award.
 Darcy Spady, 2018 SPE President

- Follow SPE rules for abbreviating academic degrees (see Section 1.3). Do not capitalize academic degrees when spelled out (i.e., bachelor's degree). Do not capitalize a field of study such as physics or petroleum engineering when used to describe a degree (e.g., BS degree in physics).
- Capitalize honorary membership titles and other SPE honors, awards, and distinctions (e.g., SPE Distinguished Service Medal, SPE Honorary Member).
- In reference lists and in technical program listings of papers and authors, use the author's initials instead of his/her given name and spell out his/her family name. Make sure to use spaces between an author's initials.
- Do not capitalize the names of devices, methods, theories, techniques, systems, or laws (except for proper names that are included): Darcy's law, Cartesian coordinates, Muskat method, Laplace transform, pendant-drop method, Stokes' law.

4.1.2 Companies and Organizations

- Capitalize names of regions, sections, chapters, committees, and other units of SPE when written in full (e.g., Permian Basin Section, SPE Board of Directors). Do not capitalize the general term when used alone or in the plural form (e.g., the section, the board meeting).
- Capitalize names of companies, institutes, foundations, colleges, universities, associations, etc. (e.g., Heriot-Watt University, Faraday Society), but do not capitalize the general term when used alone or in the plural form (e.g., the company's goals, 25-Year Club members).

NOTE: Refer to Section 4.1.2 for exceptions to this rule.

- Capitalize the official names of departments, districts, divisions, and similar major subdivisions of companies, organizations, or universities (e.g., Department of Petroleum Engineering, API Production Division). Do not capitalize the general term when it is plural or used alone (e.g., the Geosciences and Chemistry departments, the Monograph and Books committees).
- Capitalize all letters in company names only if they are true acronyms, with each letter standing for a single word, or if the company name is registered/trademarked as such (e.g., THUMS = Texaco, Humble, Union, Mobil, and Standard; Saudi Aramco = Saudi Arabian Oil Company).
- Capitalize names of specific national and state legislative, executive, and judicial bodies (e.g., US Supreme Court, UK Parliament).
- Capitalize official names of organizations but not general terms (e.g., US Navy vs. the navy).

- Do not capitalize such words as national, federal, government, and state in nonspecific or incomplete references (e.g., federal bureaus, government agencies, state bureaus, Nigerian government).

4.1.3 Geographic

- When providing locations in the US, give the city, state (unabbreviated), USA. For locations outside the US, give the city and the country. Once a location is in an article or a program, refer to the city without the state or country.

Example: The 2018 SPE Annual Technical Conference and Exhibition was held in Dallas, Texas, USA, 24–26 September.

- Capitalize such words as river, ocean, valley, etc., and geographic locations when they represent worldwide-accepted usage, real properties, or legal entities (e.g., Pacific Ocean, Gulf of Mexico, Glasscock Unit, North Sea, Middle East, Loire Valley, Platform B).
- Do not capitalize terms that refer to a compass direction or general location unless it is the name of a specific recognized region or section (e.g., central Illinois, west Texas, midcontinent area, Central America, Northern California, Mid-Continent Section).
- Do not capitalize geologic formations, such as belt, formation, zone, field, pay, basin, pool, reservoir, delta, sand, shale, or trend when used descriptively. Do capitalize the term if it is used as part of a proper name or if the formation is well-known.

Examples: the Arbuckle Zone Cardium A Pool an east Texas field
 the Delaware Basin Permian Basin Overthrust Belt
 Barnett Shale Wattenberg Field

- Capitalize geologic ages (e.g., Mesozoic), including leading adjectives (e.g., Upper Jurassic).
- Always capitalize the word “the” in The Hague, but only capitalize the word “the” in The Netherlands when referring to it in relation to a city name, as in an address.

Examples: The conference will be held in The Hague, The Netherlands.
 We visited the Netherlands on our vacation.

- Always capitalize the word “the” in official names of institutions [e.g., The Woodlands Marriott Hotel], but otherwise do not capitalize the article “the” when it refers to an academic institution.

Correct: The University of Texas enjoys a sizeable endowment.

Incorrect: The author is a member of the faculty at The University of Tulsa.

4.1.4 Events

- The official names of SPE events are listed in the SPE Long-Range Calendar. Refer to SPE events by the name that appears in the events calendar. Colons are preferred in place of em dashes in official event names.
- The number of the event is not part of the official event name for SPE events and conferences.
Correct: the 2018 SPE Annual Technical Conference and Exhibition
Incorrect: the 2010 SPE 85th Annual Technical Conference and Exhibition

Note: This applies only to SPE events and conferences. Other organizations may have different preferences regarding event names.

- Do not abbreviate any portion of the name of an SPE event when used in a technical paper. If using the full name is awkward because of its length, rewrite the sentence or use a generic term, such as “the conference.” The Offshore Technology Conference may be referred to as OTC, and the SPE Annual Technical Conference and Exhibition may be referred to as ATCE.
- Capitalize event names and themes following the capitalization rules for titles (see Section 2.1). Capitalize any SPE product, service, or event that is preceded by the term SPE. Colons are preferred in place of em dashes in official event names.

Note: “The” (not capitalized unless at the beginning of a sentence) should precede PetroBowl when PetroBowl is used as an adjective (e.g., The PetroBowl® contest...). Eliminate “The” when PetroBowl is used as a noun (e.g., PetroBowl XII will be hosted in Nova Scotia).

4.1.5 Trademarks

- Avoid using third-party trademarks (whether registered or not) to describe something presented in an article, paper, or chapter. Instead, use a generic term when available (e.g., tempered-glass plate vs. Pyrex® plate, polytetrafluoroethylene or PTFE vs. Teflon®, acrylic glass vs. Plexiglas®). If use of a third-party trademark is unavoidable, capitalize it, include the appropriate symbol (®, ™, or SM) at the end of the trademark at its first use, and acknowledge the ownership of the trademark in a reference or as a parenthetical insertion. Do not repeat use of the trademark symbol in the same article, paper, or chapter; however, do repeat it at first use in each subsequent chapter.

- When using an SPE trademark, use the appropriate symbol (®, ™, or SM) at the end of the trademark at its first or most-prominent location, and then repeat use of the symbol a reasonable number of times throughout the publication, depending on the length of the publication.

Note: The trademarked term “Energy4me” maintains capitalization when used midsentence (e.g., The Energy4me® workshop features...).

- Trademarks are adjectives. Always follow a trademarked term with a generic term (i.e., Oil and Gas Facilities® magazine). Avoid using trademarks as nouns or verbs, and do not use them in the plural or possessive.

Section 4.2: Numbers

4.2.1 General

- Write large, rounded numbers with the words “million” and “billion” or expressed in powers of 10 notation, with the number before the × greater than 0 and less than 10. Spell out the preceding numerals if nine or less, except with sums of money or units of measurement (SPE considers hours, days, months, years, and other units of time units of measurement). Never use “billion,” “trillion,” etc., with SI metric units.

Examples: 40 million six million consumers 8×10^6 m³/d USD 4 million

- Do not use commas in numbers in dates, pages, or addresses (e.g., 15 October 1997, page 1171, 1600 Pennsylvania Avenue). Use the comma with numbers of more than three digits used with customary (i.e., not SI metric) and nondimensional units (e.g., 456,789 bbl, 2,956 ft).
- Do not use a comma with SI metric units. Use a space instead; four-digit numbers followed by SI metric units require no space (e.g., 4 720 525 m³, 1525 m).
- Use the suspended hyphen when expressing a numerical series of dimensions.

Examples: The 3-, 5-, and 7-in. wellbores ...
 A 25- to 50-lbm/bbl mud ... (Not “A 25–50-lbm/bbl mud ...”)

- Punctuate ratios with a colon when using numbers (e.g., 60:20), with a slash when using words (e.g., area/volume).

4.2.2 Dates and Times

- SPE uses the **day month year** format for dates (e.g., 5 May 2017).
- Use numerals, not words, to express times and dates (exceptions are noon, midnight, and names of days and months). Do not use commas in dates in the day/month/year format.

Examples: 6 p.m. (not six p.m.)

The startup date was 5 June 1977.

Note: The combination of day, date, and time requires the use of commas, as in Thursday, 31 April 2014, at 6 p.m.

- If the day of the month is not given, do not use a comma to separate the month and the year.

Example: Waterflooding began in April 1975.

- SPE uses the 24-hour clock for its events, including all major events (ATCE, OTC, IPTC, Offshore Europe, and the Drilling Conference). When using the 24-hour clock, do not use colons (e.g., 1400 hours). Exceptions are determined on a case-by-case basis and include regional events where the 12-hour clock is customary to the regional attendees. Include “hours” after the time in text, but not in a listing of times, such as a schedule of events.

Examples: The course begins at 0800 hours.

0800 to 1200 Registration

- Write 12-hour time with lower-case letters and periods (e.g., 10 a.m.). Provide the digits for minutes only when necessary (3:37 p.m.).
- Use “noon” and “midnight” rather than 12 p.m. or 12 a.m. Do not use “12 noon” or “12 midnight.”
- Time ranges should include a.m. and p.m. at both ends only if an event begins in one and ends in the other. If the event is contained entirely in morning or afternoon, only the second time carries the designation of it.

Examples: from 10 a.m. to 2 p.m. 11 a.m.–6 p.m. 10–11 a.m.

from 2 to 6 p.m. 8 a.m.–noon

4.2.3 Phone Numbers

Use country codes with all phone numbers. The country code for the US and Canada is 1. Use periods rather than hyphens, parentheses, or slashes to separate parts of phone numbers.

Examples: 1.800.555.1212 44.171.487.4250

4.2.4 Whole Numbers

- In general, spell out “zero” and whole numbers from one through nine; use figures for 10 or more.
- Use whole numbers if the number expresses a unit of measurement or ratio (e.g., 1%, 6 km, 3 in., 6 m, 2:1, 20°C).
- Use whole numbers for dates, street addresses, currency, and times of day (e.g., USD 3, 2 p.m., 55 Park Avenue).
- Use whole numbers when grouping similar things if any of the numbers are greater than 10 (e.g., contains 4 to 16 pages vs. contains four to six pages).
- In general, avoid Roman numerals. Use Arabic numbers to designate tables, figures, and equations.
- Spell out the first term to distinguish between two adjacent numbers (e.g., twenty-one 2-acre tracts, twelve 3-hour tests).
- Spell out numbers that begin a sentence. If the numbers are so large that the sentence becomes awkward, rewrite the sentence.

Examples: Ten wells are producers; 13 are dry holes.
 Twenty-five of these wells have been shut in.
 Four-in. pipe was set.

- When using the number “1” or the word “one” in text can lead to confusion, “1.0” or the term “unity” may be substituted (e.g., “for mobility ratios other than unity”).
- Use a capital “X” to indicate magnification (e.g., 500X).

4.2.5 Fractions

- Spell out and hyphenate common fractions when used alone in the text (e.g., one-half). Use figures when the fraction is combined with a whole number or when it is used with a unit of measurement (e.g., 2¹/₄ in.). Common fractions do not exist in the SI metric system; use decimal notation instead (e.g., 3.25 kg).
- When writing decimal fractions, place a zero before the decimal point (0.5, not .5).

4.2.6 Currency

- When expressing currencies, select the appropriate three-letter abbreviation from the current list of ISO currency abbreviations (*ISO 4217:2008, Codes for the representation of currencies and funds*) for the first usage, and omit the currency symbol (\$, £, ¥). If currencies alternate repeatedly (i.e., if

there is more than one switch) within a paper or document, use the abbreviation at each instance of a currency. However, if a currency will be used often and/or consistently throughout a form or other document, an asterisked footnote noting the type of currency (e.g., “Prices are in US dollars.”) is sufficient.

Examples: USD 50.25 CAD 90.50 JPY 500 GBP 50 EUR 10.50

- In text, drop unnecessary zeroes from currencies. For example, write “USD 10” rather than “USD 10.00.” Retain the two decimals in a column of currencies only if one or more of the prices listed requires them.

4.2.7 Dimensions

- Write the designations three-dimensional, four-dimensional, etc., as 3D, 4D, etc.
- Write physical dimensions in numerals and add a multiplication symbol between the dimensions without any additional spacing. Specify the unit afterward.

Example: Each cell is 84×84×5 ft.

PART 5: POLICIES AND GUIDELINES

Section 5.1: Commercialism

Overt commercialism in SPE publications is prohibited, and items deemed to be commercial in nature will not be allowed or disseminated. Follow these guidelines when submitting any material to SPE for publication:

- Replace commercial trade names or trademarked material with generic descriptions whenever possible. See Section 4.1.5 for more information.
- Do not include company logos, trademarks, or company branding in figures or tables.
- Avoid use of text that is overtly commercial in tone or intent.

Section 5.2: Use of Copyrighted Material

- Any original SPE-copyrighted material may be used in the work with proper acknowledgement of the source (i.e., proper citation in the text and a complete reference per SPE guidelines). Any reproduced image used in SPE-copyrighted material for which SPE is not the original copyright holder will require permission to be reobtained for the new, subsequent use of the image.
- Any non-SPE-copyrighted material may be used as long as the author has obtained the necessary rights to use the material from the non-SPE source that holds the copyright. Material that comes from a PhD dissertation or MS thesis usually requires contact with the dissertation or thesis author to determine copyright holder. It must be determined whether the material in question was published anywhere prior to or subsequent to academic publishing, in which case that publication might be the copyright holder.
- In all cases of use of non-SPE-copyrighted material, authors are responsible for contacting the copyright holder and obtaining proper permission to use the copyrighted material before submitting their work to SPE for publication. The copyrighted material must be cited in the text, and a complete reference must be included per SPE guidelines.
- If any material is considered public domain, the author must be able to provide proof of such at time of submission, and proper citation/referencing within the work is required. In the US, if scientific research used in a dissertation or thesis is “substantially” funded by a government agency, the resulting document is in the public domain and the agency cannot copyright it. This restriction exists for the author also, unless the funding contract allows it. Authors are responsible for determining if such material is in the public domain before submitting their work to SPE for publication.

- Several publishers can be contacted directly to obtain permissions for non-SPE-copyrighted material. Other publishers might use a third-party service, such as Rightslink from Copyright Clearance Center. In most cases, authors will need certain statistics including publication type, date of publication, quantity, and price to obtain permission. Authors are responsible for maintaining/providing copies of permissions granted and for providing specific instructions/requirements in regard to acknowledging the copyright holder.

Section 5.3: Plagiarism

SPE expects authors to credit all sources used in their writings and not to represent work of others as their own.

- Avoid plagiarizing others by using appropriate citation.
- Indicate direct quotes as such with the use of quotation marks, or for somewhat longer passages, indented as a block quote.
- Do not repeat full sections of a prior work. Summarize and cite portions of your own prior work as you would the work of another author.

APPENDIX A: OIL-INDUSTRY TERMS

Listed here are the preferred spellings of common terms in SPE literature (except as noted in Section 1.2.3).

A	blowout (noun, adj.)	cloudpoint
a posteriori	borehole	co– (joined prefix, with exceptions)
a priori	bottomhole (adj.)	coalbed
aboveground (adj.)	bottomwater (noun, adj.)	coal gas (noun)
acknowledgment	breakdown (noun, adj.)	coal-gas (adj.)
adviser	breakthrough	coastline
afterflow	brownfield (noun, adj.)	coauthor (noun only)
afterproduction (adj.)	bubblepoint (noun, adj.)	cofferdam
alongside	build up (verb)	coiled tubing (noun)
analog	buildup (noun, adj.)	coiled-tubing (adj.)
anti– (joined prefix, with exceptions)	bullheading	cokriging
axisymmetric	buoyant	coreflood (noun, adj.)
	bypass	cost-effective
	byproduct	counter– (joined prefix, except counter-ion)
B	C	crossbed
backflow	caprock	crossfault
backflush	carry-over (noun)	crossflow
backpressure (noun, adj.)	Cartesian	crosslink (noun, verb)
backrake	casedhole (adj.)	crossplot
backup (noun, adj.)	casinghead (adj.)	cross section (noun)
backwash	catalog	cross-sectional (adj.)
ballout (noun)	centerline	crosswell (adj.)
bandwidth	changeover (noun, adj.)	cutoff (noun, adj.)
-based (hyphenated suffix)	channeling	
baseline	chokeline (noun)	D
bean up (verb phrase)	clean out (verb)	database
beanup (noun)	cleanout (noun, adj.)	data set
bicenter	clean up (verb)	de-aeration
bleedoff (noun)	cleanup (noun, adj.)	
blowdown		

deep water (noun)
deepwater (adj.)
dewpoint (noun, adj.)
disk (disc in zoology and botany)
dogleg
dot-com
down– (joined prefix)
drainhole
drawdown
drawworks
drill bit (noun)
drill-bit (adj.)
drill collar
drill-in fluid
drill off (verb phrase)
drilloff (noun, adj.)
drillout (noun, adj.)
drillpipe
drillship
drillsite
drillstem
drillstring
–drive (joined suffix)

E

e-business
e-commerce
edge water (noun)
edgewater (adj.)
electric line
electrical submersible pump

electro– (joined prefix, with exceptions)
email
endpoint
engine room
extra– (joined prefix in most uses)
extranet

F

fail-safe
fallback (noun)
falloff
farm out (verb phrase)
farmout (adj.)
feedwater (noun)
Fiberglas (trade name)
fiberglass (generic term)
fiber-optic (adj.)
fieldwide (adj.)
fill up (verb)
fill-up (noun, adj.)
filter cake (noun)
filter-cake (adj.)
fireflood
fire tube (noun)
fire-tube (adj.)
firsthand
five-spot (noun, adj.)
flood front
floodwater
flowback (noun, adj.)

flow chart
flowline (noun, adj.)
flow loop
flowmeter
flow rate
–fold (joined suffix)
follow-up (adj., noun)
frac pack (noun)
frac-pack (adj.)
-free (hyphenated suffix)
freestanding
fresh water (noun)
freshwater (adj., adv.)

G

gamma ray log (no hyphen)
gas cap
gas field (noun)
gasfield (adj.)
gasflood
gas lift (noun, adj.)
gauge
gray (not “grey”)
gridblock
gridpoint
groundtruthing
groundwater (noun, adj.)
guar
guidepile

H

half-length

half-life (noun, adj.)

half-width

heavyweight

hindcast

hold down (verb)

holddown (noun)

hold up (verb)

holdup (noun, adj.)

hookload (noun)

hookup (noun, adj.)

hot-water (adj.)

huff 'n' puff

I

in situ (adv.)

in-situ (adj.)

infill

injection well

inter– (joined prefix)

Internet

intranet

J

jack up (verb)

jackup (adj.)

judgment

K

kerosene

keypunch

keyseat

kick off (verb phrase)

kickoff (noun)

knockout (noun, adj.)

knowledge base

L

laboratory (not “lab”)

leak off (verb)

leakoff (noun, adj.)

life cycle

liftoff (noun)

lightweight

line pipe

lock up (verb phrase)

lockup (noun)

log-normal

long-reach

long-standing

M

macromodel

main-bore (adj.)

main bore (noun)

make up (verb)

makeup (noun, adj.)

man-hour

man-year

meter (not “metre”)

micro– (joined prefix)

mid– (joined prefix, with exceptions)

Mid-Continent (SPE section)

milled-tooth bit

mineback (noun)

mis-tie(s)

mixed-wet

modeled

modeling

moonpool

motherbore

mudcake

mud filtrate (noun)

mudline

mud motor

mud-weight (adj.)

multi– (joined prefix, with exceptions)

multiphase flow

N

naphtha

net-pay

non– (joined prefix, with exceptions)

O

off-bottom

offline (adj.)

offset

offshore

off-site (adj., adv.)

off-take (noun)

oil field (noun)

oilfield (adj.)

oilflood

oil well (noun)

oilwell (adj.)

oil-wet

OnePetro

online (adj.)

on-site (adj., adv.)

on-stream (adj.)

open flow

open hole (noun)

openhole (adj.)

outcrop

over- (joined prefix)

P

pack off (verb phrase)

packoff (noun)

padeye

particle-size distribution

pay out (verb)

payout (noun)

phase out (verb phrase)

phaseout (noun)

pick up (verb phrase)

pickup (noun, adj.)

pinchout (noun)

pinch out (verb phrase)

pipeline

plaster of Paris

plugback

Poisson's ratio

poly- (joined prefix)

pore-water fluid

Portland cement

post- (hyphenated prefix)

pre- (joined prefix, with exceptions)

preventative

printout (noun)

pro- (joined prefix, with exceptions)

pseudo- (joined prefix)

pseudosteady state (noun)

pseudosteady-state (adj.)

pulse-loading

pumpdown

pumphead

pumpoff (adj.)

Q

quasi- (joined prefix, except

quasi-equilibrium)

R

ramp up

rate-pressure

rathole

re- (joined prefix)

read out (verb phrase)

readout (noun)

real time (noun)

real-time (adj.)

rigsite

roller-cone bit

S

salt water (noun)

saltwater (adj., adv.)

sandface

sandout

sandpack

sand screen

scaleup (noun, adj.)

screenout (noun, adj.)

seabed, seafloor

sealbore

seastate (noun, adj.)

seawater

seismic (adj.)

seismics (noun)

self- (hyphenated prefix)

semi- (joined prefix, with exceptions)

setup (noun)

shaly

shoreline

short-term

shut down (verb phrase)

shutdown (noun)

shut in (verb)

shut-in (noun, adj.)

shut off (verb)

shutoff (noun, adj.)

sidetrack

sidewall

slackoff

slickline

slickwater
slimhole
slimtube
slow down (verb phrase)
slowdown (noun)
slug catcher
smartwater
space out
speed up (verb phrase)
speedup (noun)
splash plate
standalone (adj.)
standby (adj.)
stand off (verb)
standoff (noun, adj.)
standpipe
start up (verb)
startup (noun, adj.)
steady state (noun)
steady-state (adj.)
steam chest
steamdrive (noun, adj.)
steamflood
step-out (adj.)
stepout (noun)
stepwise
stick/slip
stock tank (noun)
stock-tank (adj.)
stopcock
straightedge
straightline (adj.)

streamtube
sub- (joined prefix)
sulfate
sulfide
sulfur
super- (joined prefix)
swage (not “swedge”)
sweepout (noun, adj.)

T

tail pipe
thermopowered
thin-section (noun in laboratory tests)
throughput
through-tubing (adj.)
tieback (noun, adj.)
tie line (noun)
tie-line (in mathematics)
time frame (noun)
timeline
timestep (noun)
timetable
tool face
tool joint
topdrive
tophole (adj.)
towout (noun, adj.)
traveltime
tricone
trunkline
tubinghead (adj.)

twistoff
type curve (noun)
type-curve (adj.)

U

ultra- (joined prefix)
ultradeepwater
un- (joined prefix)
under- (joined prefix)
under way
up- (joined prefix)
updip
uphole/upstream

V

V-door
vendor
viscoelastic

W

wash out (verb phrase)
washout (noun)
waste water (noun)
wastewater (adj.)
water block
water blocking
water cut (noun)
water-cut (adj.)
waterdrive
waterflood
waterfrac
water-wet

web	–wide (joined suffix)	work over (verb)
website	wind field (noun)	workover (noun, adj.)
well-being	windfield (adj.)	work string
wellbore	wind speed (noun)	worldwide
wellblock	wireline	World Wide Web
wellhead	–wise (joined suffix)	
wellpoint	workboat (noun)	X
wellsite	workflow	X-ray
wellstream	workforce	
well test	work group	

APPENDIX B: COMMON ABBREVIATIONS

The following terms are often abbreviated in SPE literature. Follow the rules of abbreviation as detailed in Part 1 of this guide.

AC	alternating current	GUI	graphical user interface
BA	bachelor of arts	GOM	Gulf of Mexico
BS	bachelor of science	HSSE	health, safety, security, and environment
BOE	barrel of oil equivalent	HP/HT	high-pressure/high-temperature
BS&W	basic sediment and water	HCPV	hydrocarbon pore volume
BOP	blowout preventer	HPAM	hydrolyzed polyacrylamide
BHA	bottomhole assembly	HEC	hydroxyethyl cellulose
BBS	bulletin board system	HPG	hydroxypropyl guar
c.u.	capture unit	i.e.	id est (that is)
CRT	cathode ray tube	ID	inside/inner diameter
CPU	central processing unit	IFT	interfacial tension
CWE	cold water equivalent	IOC	international oil company
CUG	computer user group	KB	kelly bushing
CT	computed tomography	LACT	lease automatic custody transfer
DC	direct current	LNG	liquefied natural gas
PhD	doctor of philosophy	LPG	liquefied petroleum gas
EOR	enhanced oil recovery	LAN	local area network
EOS	equation of state	MA	master of arts
ECD	equivalent circulating density	MS	master of science
et al.	et alia (and others)	MD	measured depth
etc.	et cetera (and the rest)	MDRT	measured depth from rotary table
e.g.	exempli gratia (for example)	MWD	measurement while drilling
E&P	exploration and production	NOC	national oil company
FTP	file transfer protocol	NPV	net present value
FVF	formation volume factor	NMR	nuclear magnetic resonance
GC	gas chromatography	OIP	oil in place
GOC	gas/oil contact	OIIP	oil initially in place
GOR	gas/oil ratio		

OOIP	oil originally in place (or original oil in place)	SP	self-potential
		spf	shots per foot
OBM	oil-based mud	SG	specific gravity
OS	operating system	SS	subsea
OD	outside/outer diameter	TD	total depth
PV	pore volume	TDS	total dissolved solids
p.u.	porosity units	TVD	true vertical depth
ppa	pounds of proppant added	UV	ultraviolet
PVT	pressure/volume/temperature	URL	uniform resource locator
PI	productivity index	vs.	versus
QA	quality assurance	WAG	water alternating gas
QC	quality control	WOC	water/oil contact
ROP	rate of penetration	WOR	water/oil ratio
R&D	research and development	WBM	water-based mud
ROS	residual oil saturation	WOB	weight on bit
RMS	root mean square	WAN	wide area network
SEM	scanning electron microscope	XRD	X-ray diffraction

APPENDIX C: ORGANIZATIONS AND CORPORATE SUFFIXES

Section C-1: Organizations

The following are abbreviations for some of the organizations that may be mentioned in SPE literature. When these organization names are used often in an article, they should be spelled out at first use, followed by the abbreviation in parentheses, and abbreviated throughout the rest of the article.

American Petroleum Institute	API
American Institute of Mining, Metallurgical, and Petroleum Engineers	AIME
American Association of Petroleum Geologists	AAPG
American Chemical Society	ACS
American Gas Association	AGA
American Geophysical Union	AGU
American Society for Testing and Materials	ASTM
American Society of Civil Engineers	ASCE
American Society of Mechanical Engineers	ASME
American Institute of Chemical Engineers	AIChE
Gas Technology Institute	GTI
International Association of Drilling Contractors	IADC
National Association of Corrosion Engineers	NACE
Petrotechnical Open Software Corporation	POSC
Society of Exploration Geophysicists	SEG
Society for Mining, Metallurgy, and Exploration	SME
Society of Professional Well Log Analysts	SPWLA
The Minerals, Metals, and Materials Society	TMS
US Department of Energy	US DOE
US Geological Survey	USGS

Section C-2: Corporate Suffixes

Corporate suffixes should be included in author bylines, as well as bios, if they are provided.

Aktiebolag	A.B.	Andelslag	A/L
Aktiengesellschaft	A.G.	Aksjeselskap	A/S

Beperk	Bpk.	Limitee	Ltee.
Besloten Vennootschap	B.V.	mit beschränkter Haftung	mbH
met beperkte, Anasprakelijkheid		Maatschappij	Mij.
Compañía Anónima	C.A.	No Liability	N.L.
Companhia/Compañía	Cia.	No Personal Liability	NPL
Compagnie	Cie.	Naamloze Vennootschap	N.V.
Company	Co.	Osakeyhtiö	Oy.
Corporation	Corp.	Public Limited Company	plc
Compañía de Responsabilidad Limitada	CRL	Perusahaan Terbatas	P.T.
		Private	Pte.
Commanditaire Vennootschap	C.V.	Proprietary	Pty.
Eiendoms Beperk	Edms.	Private	Pvt.
Bpk.		Société Anonyme; Sociedad Anónima	S.A.
Etablissements(s)	Ets.		
Gesellschaft	Ges.	Sociedad Anónima Inversiones	SAI
Gesellschaft mit beschränkter Haftung	GmbH	Sociedad Anónima Comercial	SAC
		Sociedad Anónima de	SARL
Handelsbolag	H.B.	Responsabilidade Limmitada;	
Incorporated	Inc.	Société Anonyme à	
Interessentselskab	I/S	Responsabilité Limiteé	
Kommanditbolag	K.B.	Sendirian Berhad	Sdn. Bhd.
Kommanditgesellschaft	K.G.	Sociedad Limitada	S.L.
Kabushiki Kaisha	K.K.	Société Coopérative	Soc. Cve.
Kommandittselsap	K/S	Società per Azioni	SpA
Limited Liability Company	LLC	Società a Responsabilita Limitata	SRL
Limited	Ltd.	Samenwerkende Vennootschap	S.V.
Limitada	Ltda.		

APPENDIX D: COMMON OILFIELD UNITS

barrels of fluid per day	BFPD [m^3/d fluid]	inches per second	in./sec [cm/s]
barrels of liquid per day liquid]	BLPD [m^3/d	kilopound (1,000 lbf)	kLbf [N]
barrels of oil per day	BOPD [m^3/d oil]	kilowatt hour	kW-hr [J]
barrels of water per day water]	BWPD [m^3/d	kips per square inch	ksi [Pa]
barrels per day	B/D [m^3/d]	millidarcy	md
barrels per minute	bbl/min [m^3/s]	million electron volts	MeV [MJ]
billion cubic feet	Bcf [10^9 m^3]	million cubic feet	MMcf
billion cubic feet per day	Bcf/D [$10^9 \text{ m}^3/\text{d}$]	mils per year	mil/yr [m/a]
cubic feet per barrel	ft^3/bbl [m^3/m^3]	ohm	Ω
cubic feet per day	ft^3/D [m^3/d]	pound per cubic foot	lbm/ ft^3 [kg/m^3]
cubic feet per minute	ft^3/min [m^3/s]	pound per gallon	lbm/gal [kg/m^3]
cubic feet per pound mass	ft^3/lbm [m^3/kg]	reservoir barrel	res bbl [res m^3]
cubic feet per second	ft^3/sec [m^3/s]	reservoir barrel per day	RB/D [res m^3/d]
cubic yard	cu yd	square feet	ft^2 [m^2]
darcy	(spell out)	square mile	sq mile [km^2]
dead-weight ton	DWT [Mg]	standard cubic feet per barrel	scf/bbl
feet per minute	ft/min [m/s]	standard cubic feet per day	scf/D [std m^3/d]
feet per second	ft/sec [m/s]	standard cubic foot	scf [std m^3]
foot-pound	lbf-ft or ft-lbf [J]	stock-tank barrel	STB
gallons per minute	gal/min [m^3/s]	stock-tank barrels per day	STB/D
gallons per day	gal/D [m^3/d]	stoke	[stock-tank m^3/d]
gram	g	thousand cubic feet	St [m^2/s]
horsepower-hour	hp-hr [J]	trillion cubic feet	Mcf
			Tcf [10^{12} m^3]

APPENDIX E: MATH SIGNS AND OPERATORS

ℓ, \exp	exponential function	+	plus
–	minus	±	plus or minus
×	multiplied by	÷	divided by
=	equal to	≠	not equal to
≈	nearly equal to	≅	congruent with
≡	identical with	≠	not identical with
⇔	equivalent to	>	greater than
⋈	not greater than	<	less than
⩾	not less than	≥	greater than or equal to
≤	less than or equal to	~	distributed as; poorly approximates
√	square root	$\sqrt[3]{}$	cube root
$\sqrt[n]{}$	<i>n</i> th root	erf	error function
erfc	error function, complementary	→	vector
∴	therefore	∵	because
:	is to; divided by	∴	as; equals (geometrical proportion)
∞	varies as	⊖	approaches a limit
∞	infinity	∫	iIntegral
d	differential	∂	partial differential
∑	summation of	!	factorial product
π	pi (math constant = 3.1416)	ε	epsilon (math constant = 2.7183)
°	degree*	'	minute; prime
"	second	∠	angle
∇	del (gradient operator)	Δ	delta (difference operator)
∈	set identifier		

* Do not substitute a superscript letter O or number zero for the degree symbol.

APPENDIX F: GREEK ALPHABET

A	α	Alpha
B	β	Beta
Γ	γ	Gamma
Δ	δ	Delta
E	ε	Epsilon
Z	ζ	Zeta
H	η	Eta
Θ	θ	Theta
I	ι	Iota
K	κ	Kappa
Λ	λ	Lambda
M	μ	Mu
N	ν	Nu
Ξ	ξ	Xi
O	\omicron	Omicron
Π	π	Pi
P	ρ	Rho
Σ	σ	Sigma
T	τ	Tau
Υ	υ	Upsilon
Φ	ϕ	Phi
X	χ	Chi
Ψ	ψ	Psi
Ω	ω	Omega

APPENDIX G: SPE REFERENCE STYLE EXAMPLES

Section G-1: SPE-Specific Examples

Paper Submitted for Review, Not Yet Accepted/Published

Abedi, J., Kariznovi, M., and Nourozieh, H. *In press*. Measurement and Correlation of Viscosity and Density for Compressed Athabasca Bitumen at Temperatures up to 200°C. *J Can Pet Technol* (submitted 17 November 2013).

Conference Paper (-MS)

White, C. D. and Horne, R. N. 1987. Computing Absolute Transmissibility in the Presence of Fine-Scale Heterogeneity. Paper presented at the SPE Symposium on Reservoir Simulation, San Antonio, Texas, USA, 1–4 February. SPE-16011-MS. <https://doi.org/10.2118/16011-MS>.

Direct-to-Peer Papers (Non-Conference), Not Found On OnePetro

Johnson, B. 1990. Reservoir Management. Paper SPE 36514 available from SPE, Richardson, Texas.

Published Journal Article Not Available From OnePetro

Diamond, D. 1991. High Pressure Leaks and How to Plug Them. *SPE J.* **6** (1): 112–114.

Discussion/Reply to a Published Paper

Peaceman, D. W. 1990. Further Discussion of Productivity of a Horizontal Well. *SPE Res Eng* **5** (3): 437–438. SPE-20799-DS. <https://doi.org/10.2118/18298-PA>.

NOTE: For papers that have the discussion/reply as a separate document, as in the above example, use individual discussion's SPE number, if different from that of main paper, but always use DOI of main paper. Most papers, however, will have the discussion/reply included in the paper's online PDF and should just be cited as a section of the paper, as in the examples below.

Civan, F. 2010. Discussion of a Consistent and Accurate Dead-Oil-Viscosity Method. *SPE Res Eval & Eng* **13** (4): 815–840 (discussion follows paper). SPE-110194-PA. <https://doi.org/10.2118/110194-PA>.

Davis, E. G. Jr. and Hawkins, M. F. Jr. 1963. Linear Fluid-Barrier Detection by Well Pressure Measurements (includes associated discussion and reply). *J Pet Technol* **15** (10): 1077–1079. SPE-462-PA. <https://doi.org/10.2118/462-PA>.

JPT Article (Paper Highlights), Not Found in OnePetro

Denney, D. 2005. Slick-Water and Hybrid Fracturing Treatments: Lessons Learned (contains highlights of paper SPE 89876, prepared for the 2004 SPE Annual Technical Conference and Exhibition by M. M. Sharma, P. B. Gadde, R. Sullivan, R. Sigal, R. Fielder, D. Copeland, L. Griffin, and L. Weijers). *J Pet Technol* **57** (3): 38–40.

Published Journal Article (-PA)

King, M. J. and Mansfield, M. 1999. Flow Simulation of Geologic Models. *SPE Res Eval & Eng* **2** (4): 351–367. SPE-57469-PA. <https://doi.org/10.2118/57469-PA>.

SPE Paper Published in Transactions (1921–1995)

Harris, P. C. and Reidenbach, V. G. 1987. High-Temperature Rheological Study of Foam Fracturing Fluids. In *Transactions of the Society of Petroleum Engineers*, Vol. 283, Part I, SPE-13177-PA, 613–619. Richardson, Texas: Society of Petroleum Engineers.

OR

Harris, P. C. and Reidenbach, V. G. 1987. High-Temperature Rheological Study of Foam Fracturing Fluids. *J Pet Technol* **39** (5): 613–619. SPE-13177-PA. <https://doi.org/10.2118/13177-PA>.

BUT NEVER

Tracy, G. W. 1955. Simplified Form of Material Balance Equation. SPE-438-G. *Trans., AIME*, **204**: 243–255.

NOTE: You may still see the Trans. format in use by some authors, but Transactions papers should always be cited as either a book section or a journal paper.

SPE Preprint Papers (formerly Online First Papers)

Garmeh, G., Johns, R. T., and Lake, L. W. 2009. Pore-Scale Simulation of Dispersion in Porous Media. *SPE J.* SPE-110228-PA (in press; posted 19 February 2009). <https://doi.org/10.2118/110228-PA>.

SPE Monograph

Matthews, C. S. and Russell, D. G. 1967. *Pressure Buildup and Flow Tests in Wells*, Vol. 1, 13–16. Richardson, Texas: Monograph Series, Society of Petroleum Engineers.

SPE Books

Bradley, H. B. ed. 1992. *Petroleum Engineering Handbook*, third edition, Chap. 26. Richardson, Texas: Society of Petroleum Engineers.

Beggs, H. D. 1987. Oil System Correlations. In *Petroleum Engineering Handbook*, ed. H. B. Bradley, Chap. 22. Richardson, Texas: Society of Petroleum Engineers.

Bourgoyne, A. T., Chenevert, M. E., and Millheim, K. K. 1986. *Applied Drilling Engineering*, Vol. 2, 173–175. Richardson, Texas: Textbook Series, Society of Petroleum Engineers.

Chambers, M. R. ed. 2002. *Multilateral Wells*, Vol. 53, 15–21. Richardson, Texas: Reprint Series, Society of Petroleum Engineers.

SPE Distinguished Lecture/Distinguished Author Series

Schein, G. 2005. The Application and Technology of Slickwater Fracturing. Paper SPE 108807 presented as a Distinguished Lecture during the 2004–05 season.

King, G. E. 1985. Foam and Nitrified Fluid Treatments—Stimulation Techniques and More. Paper SPE 14477 based on a speech presented as a Distinguished Lecture during the 1985–86 season.

Clegg, J. D., Bucaram, S. M., and Hein, N. W. Jr. 1993. Recommendations and Comparisons for Selecting Artificial-Lift Methods. Distinguished Author Series, *J Pet Technol* **45** (12): 1128–1167. SPE-24834-PA. <https://doi.org/10.2118/24834-PA>.

Paper With Non-SPE Number

Rahman, N. M. A., Mattar, L., and Zaoral, K. 2006. A New Method for Computing Pseudo-Time for Real Gas Flow Using the Material Balance Equation. *J Can Pet Technol* **45** (10): 36–44. PETSOC-06-10-03. <https://doi.org/10.2118/06-10-03>.

Section G-2: Books

Book With Edition Number

Ahmed, T. 2006. *Reservoir Engineering Handbook*, third edition. Burlington, Massachusetts: Gulf Professional Publishing/Elsevier.

Book With Editor Attributed

Pirson, S. J. ed. 1958. *Oil Reservoir Engineering*, 56–58. New York City: McGraw-Hill Book Co.

Book Without Author Attributed

Platts' Oilgram Regulatory Insight, second edition, 2. 1976. New York City: McGraw-Hill Book Co. Inc.

Book With Author and Translator Attributed

Snyyvek, J. B. 1968. *Petroleum Science*, second edition, trans. L. Friedman. Cambridge, Massachusetts: Oilfield Science Series, Elsevier (1977).

Chapter in a Book (Author and Editor Attributed)

Somasundaran, P. 1975. Interfacial Chemistry of Particulate Flotation. In *Advances in Interfacial Phenomena of Particulate/Solution/Gas Systems*, ed. P. Somasundaran and R. B. Grieves, Chap. 1, 1–15. New York City: Symposium Series, AIChE.

Foreign Title (Translated)

Darcy, H. P. G. 1856. *The Public Fountains of the City of Dijon (Les Fontaines publiques de la ville de Dijon)*, trans. P. Bobeck. Dubuque, Iowa: Kendall Hunt Publishing Co. (2004)

Leibenzon, L. S. 1934. *Mechanics in Oil Production, Part II* (in Russian). Moscow: Gorgeonefteizdat.

Reprint

Muskat, M. 1949. *Physical Principles of Oil Production*. Columbus, Ohio: McGraw-Hill (repr. Springer, 1981).

Section G-3: Journal, Magazine, or Newspaper Articles

Article in a Journal or Magazine

Journel, A. G. 2002. Combining Knowledge From Diverse Sources: An Alternative to Traditional Data Independence Hypotheses. *Mathematical Geology* **34** (5): 573–596.

Article Without Author Attributed

Doubling of Reserves Seen Possible. 1976. *Oil & Gas J.* **74** (31 May): 22–25.

Non-Journal Article/Whitepaper With Author and Translator Attributed

Borisov, J. P. 1964. Oil Production Using Horizontal and Multiple Deviation Wells, trans. J. Strauss. Bartlesville, Oklahoma: R&D Library, Phillips Petroleum Co. (1984).

Foreign Language Article (translated)

Verigin, N. N. 1952. On the Pressurized Forcing of Binder Solutions into Rocks in Order to Increase the Strength and Imperviousness to Water of the Foundations of Hydrotechnical Installations (in Russian). *Akademija Nauk SSR Izvestija Otd. Tehn. Nauk* **5**: 674–687.

Einstein, A. 1906. Eine neue Bestimmung der Moleküldimensionen (A new determination of the molecular dimensions). *Ann. Phys.* **19** (2): 289–306.

Article Submitted/Not Yet Published

Hagoort, J. *In press*. Simplified Analytical Method for Estimating the Productivity of Horizontal Wells Producing at Constant Rate or Constant Pressure. *Journal of Pet. Sci. Eng.* (submitted 8 January 2006).

Article Published Online, In Press

Mari, J. L., Porel, G., and Bourbiaux, B. 2009. From 3D Seismic to 3D Reservoir Deterministic Model Thanks to Logging Data: The Case Study of a Near Surface Heterogeneous Aquifer. *Oil & Gas Science and Technology—Rev. IFP* (in press; published online 19 February 2009).

<https://doi.org/10.2516/ogst/2008049>.

Meeting Paper Included in a Proceedings Volume

Fisk, H. N. 1955. Recent Mississippi River Sedimentation and Peat Accumulation. *Proc.*, Fourth World Petroleum Congress, Rome, 6–15 June, Sec. I/C, 1–21.

NOTE: *If a reference marked as Proceedings does not include page numbers, cite it as a conference paper instead. If it has title, editor, and publisher information included, cite it as a book section.*

Online Article With No Author Attributed

Schlumberger. 2005. Well Fire and Brimstone, <http://www.schlumberger.com/phony/> (accessed 26 March 2007).

Oral Presentation, not Included in Conference Proceedings

Detienne, J. L. and Po, V. 2005. PWRI Design for Soft Sand Formations. Oral presentation given at the SPE Advanced Technology Workshop on Produced Water Re-injection, Biarritz, France, 20–24 June.

Newspaper Article

Mazzetti, M. J. and Nekså, P. 2012. Tapt Kraft til Nytte. *Dagens Næringsliv* (30 November 2012): 36–37.

Kolata, G. 1990. What if They Closed 42nd Street and Nobody Noticed? *The New York Times* (25 December 1990), <http://www.nytimes.com/1990/12/25/health/what-if-they-closed-42nd-street-and-nobody-noticed.html>.

Section G-4: Miscellaneous

Blog

Katz, J. 1998. Luring the Lurkers. Slashdot, 29 December 1998, <http://slashdot.org/story/98/12/28/1745252/Luring-the-Lurkers> (accessed 23 June 2011).

American Association of Petroleum Geologists (AAPG). 2011. AAPG Learn! Blog, <http://blog.aapg.org/learn/> (accessed 23 June 2011).

Brochure

PCS. 2005. Sales and Service Satisfaction brochure. 2005. Lupton, Colorado: Production Control Services Inc.

Congressional Hearing—Testimony

Happer, W. 2009. Climate Change. Oral testimony given before the 111th Congress Full Committee hearing “Update on the Latest Global Warming Science,” US Senate Environment and Public Works Committee, Washington, DC, 25 February.

Dharan, B. G. 2004a. Prepared testimony for the US House Committee on Financial Services, 108th Congress, Second Session. Improving the Relevance and Reliability of Oil and Gas Reserves Disclosures, 31–50. Hearing, 21 July 2004 (Serial No. 108–105), Shell Games: Corporate Governance and Accounting for Oil and Gas Reserves, http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=108_house_hearings&docid=f:96549.pdf (downloaded 14 January 2010).

Court Case

El Paso Firemen and Policemen’s Pension Fund v. Stone Energy Corporation. 2006. Case 6:05-cv-02088-TLM-MEM, Doc. 61 (W.D. La. 14 June 2006), http://securities.stanford.edu/filings-documents/1035/SGY05_01/2007817_r01x_0502088.pdf (downloaded 22 June 2010).

Groucho Marx Prods. v. Playboy Enters. 1977. No. 77, Civ. 1782 (S.D. N.Y. 30 December 1977).

Database

NOTE: Journal, magazine, or newspaper articles accessed through a database should be referenced as a journal, magazine, or newspaper article.

- Thoms, K. J. 2001. They're Not Just Big Kids: Motivating Adult Learners. ERIC database, <http://www.eric.ed.gov/> (accessed 1 January 2001).
- National Petroleum Council. 1984. NPC Public Database, <http://www.netl.doe.gov/technologies/oil-gas/Software/database.html> (accessed 23 May 1990).
- Lemmon, E. W., Huber, M. L., and McLinden, M. O. 2007. NIST Standard Reference Database 23: Reference Fluid Thermodynamic and Transport Properties-REFPROP, Version 8.0. Gaithersburg, Maryland: Standard Reference Data Program, National Institute of Standards and Technology.

Film/Video or Other A/V Recording

- Taylor, G. I. 1972. Low Reynolds number flows. VHS produced by Educational Services Incorporated under the direction of the National Committee for Fluid Mechanics Films. Chicago, Illinois: Encyclopaedia Britannica Educational Corporation.

Lecture, Short Course, or Course Notes

- Caicedo, M. and Mora P. 2004. Temas de propagacion de ondas. Lecture, Universidad Simón Bolívar, Caracas (25 June 2014).
- Kamal, M. M. 1998. What You Can and Cannot Obtain from Today's Well Testing Technology. Presented as an SPE Distinguished Lecture during the 1997–1998 season; February 1998 lecture presented in Perth, Australia.
- Canadian Society of Petroleum Geologists (CSPG). 2006. Coal Bed Methane: An Integrated Approach to Reservoir Characterization and Production. CSPG CSEG SWLS Short Course SCPRE 10 presented 12 May 2006, Calgary, Alberta.
- Thomsen, L. 2002. Understanding seismic anisotropy in exploration and exploitation. Lecture Notes, SEG/EAGE Distinguished Instructor Short Course No. 5, Tulsa, Oklahoma.

Legal Citation

- US Code of Federal Regulations. 1996. 33 CFR § 155.1010, Oil or Hazardous Material Pollution Prevention Regulations for Vessels, Subpart D—Tank Vessel Response Plans for Oil—Purpose [CGD 91-034, 61 FR 1081]. <http://www.ecfr.gov/cgi-bin/text-idx?c=ecfr&SID=eddbedaf9c9739d0c0ce79d3ea762279&rgn=div8&view=text&node=33:2.0.1.5.24.4.161.1&idno=33> (accessed May 2012).
- 2 Colorado Code of Regulations § 404-1:1202.d.(2) (2007).

NOTE: Use of Bluebook standard for legal citations is acceptable.

Patents—US and International

- Cardenas, R. L., Carlin, J. T., and Flournoy, K. H. 1974. Surfactant Oil Recovery Process for Use in Formations Containing High Concentrations of Polyvalent Ions Such as Calcium and Magnesium. US Patent No. 3,799,264.
- Moses, V. and Harris, R. E. 1994. Acidising Underground Reservoirs. International (PCT) Patent No. WO 94/25731.
- Lund, A., Lysne, D., Larson, R. et al. 2004. Method and system for transporting a flow of fluid hydrocarbons containing water. US Patent No. 6,774,276; International (PCT) Patent No. WO/2000/025062; Norwegian Patent No. NO 311,854.

PhD Dissertation or MS Thesis

Flemal, R. C. 1967. *Sedimentology of the Sespe Formation, Southwestern California*. PhD dissertation, Princeton University, Princeton, New Jersey (May 1967).

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APPENDIX H: SAMPLE FIGURES

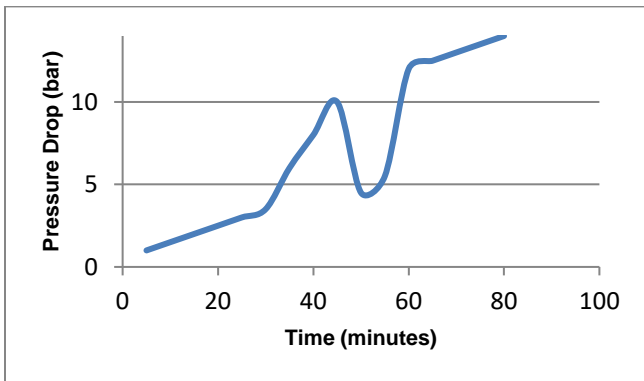


Fig. 1—Pressure drop vs. time during the injection of suspension fluid.

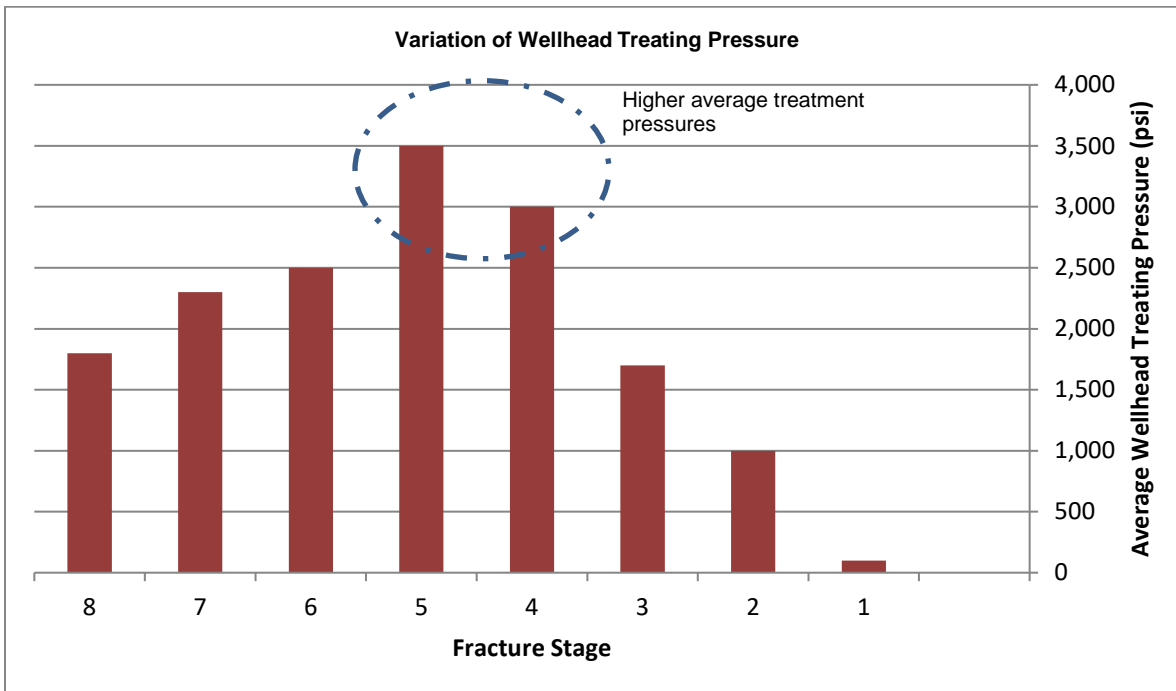


Fig. H-1—Average wellhead treating pressure between fracture stages in Well 5

APPENDIX I: SAMPLE TABLES

Tables should be constructed with readability in mind. Extra-large tables, especially those meant to be viewed in landscape mode, might require special formatting on a case-by-case basis.

Examples: 3.33 in. (20pi) wide

Layer	Porosity	Permeability	Completion Interval
1	0.3080	725 md	2.0 m
2	0.2880	1,591 md	17.8 m
3	0.3240	3,093 md	28.6 m

Table I-1—Completion layer properties for Well B.

	Porosity (%)	Permeability (darcies)
Grade 6 beads	42	259
Grade 9 beads	40	104
Grade 11 beads	38	10

Table I-2—Porosities and permeabilities of the different bead sizes.

Cell dimensions (LxHxD)	69.8x 21.7x3.5 cm
Initial pressure	847 kPa
Initial temperature	20°C
Cell permeability	$1135 \times 10^{-12} \text{ m}^2$
Cell porosity	0.391
Oil viscosity	10 000 mPa·s at 20°C
Oil density	979 kg/m ³

Table I-3—Experimental parameters.

Probabilistic Values From CDF		Parameter Sets Corresponding to t_M Values			
Value	t_M (year)	Q_∞ (Bbbl)	t_M (year)	S_L (year)	S_oS
P10	2009.1	2543.3	2009.1	19.5	1.817
P50	2013.5	2543.3	2013.5	19.9	1.829
P90	2018.3	2543.3	2018.3	20.5	1.839
Mean	2013.6	2543.3	2013.6	19.9	1.830
P10	2014.6	2900.8	2014.6	20.2	1.8199
P50	2018.8	2900.8	2018.8	20.6	1.8303
P90	2023.4	2900.8	2023.4	21.4	1.8365
Mean	2018.9	2900.8	2018.9	20.6	1.8306

Table I-4—Parameter sets for $Q_\infty = 2,543.3$ and $Q_\infty = 2,900.8$ bbl for Hubbert model of world oil production data through 2008 ($R=8$).

Examples: 5 in. (30pi) wide

Symbol	Value	Description
F_a	324.8	Friction parameter in annulus
h_{tvd}	9587	Total vertical depth
h_{rb}	2150	Vertical depth to seabed
r_{ri}	0.4509	Riser inner radius
r_{do}	0.127	Drillstring outer radius
c_1	10	Parameter related to drillstring velocity
c_2	25	Parameter related to drillstring acceleration
p_0	1	Atmospheric pressure (bar)
F_r	0.003	Friction parameter in the riser
$\bar{\rho}_a$	1.7705	Average density in the annulus
$\bar{\rho}_r$	1.7470	Average density in the riser

Table I-5—Parameter estimates for MPC model in Eqs. 17 through 20 (values are based on well information and step responses).

Benefits	CLLNG	CSF	CCSL	CLPG
(a) Reduced storage requirements	Y	Y	Y	Y
(b) Improved delivery to storage	N	Y	N	N
(c) Enhanced export growth potential	Y	Y	Y	Y
(d) Efficient incremental expansion	Y	Y	Y	Y
(e) Reduced stranded costs	Y	Y	Y	Y
(f) Improved maintenance planning	Y	Y	Y	Y
(g) Enhanced response to upsets	Y	Y	Y	Y
(h) Improved capability to optimize fleets	Y	N	N	N
(i) Reduced port congestion	N	N	Y	N

Key: Y = Benefit for specific common facility; N = Little or no benefit for a specific common facility

Table I-6—Summary of specific common facility benefits.

Examples: 6.83 in. (41pi) wide

IFT (mN/m)	RI		IPA Concentration (%)		Water Concentration (%)		Cyclohexene Concentration (%)	
	Gas	Oil	Gas	Oil	Gas	Oil	Gas	Oil
24.20	1.44737	1.33388	0.00	0.00	0.00	100.00	100.00	0.00
6.90	1.44517	1.35204	1.04	27.04	0	72.70	82	0.27
0.60	1.41783	1.36408	33.49	43.08	2.51	53.54	64.01	3.37
0.03	1.39930	1.37200	50.06	50.07	11.51	41.59	38.43	8.34

Table I-7—Concentrations by volume of isopropyl alcohol, water, and cyclohexene in the equilibrated phases used for the determination of relative permeability as a function of IFT.

Case	Oil	Gas	Temp. (°C)	Minimum Miscibility Pressure (MPa)						
				Experimental			Calculation		Deviation From VIT (%)	
				VIT	Slimtube	Rising-Bubble	Analytical	EOS	Analytical	Slimtube
1	RKR live oil	51 mol% C ₂₊	87	14.8 ^d	—	—	16.2 ^h	15.6 ⁱ	9.5	—
2	RKR live oil	52.5 mol% C ₂₊	87	14.0 ^d	—	—	15.2 ^h	16.4 ⁱ	8.6	—
3	RKR stock tank oil ^b	Ethane	87	18.3 ^d	11.2 ^d	—	—	—	—	—38.8
4	RKR stock tank oil ^b	Propane	87	3.9 ^d	3.0 ^d	—	—	—	—	—23.1
5	Terra Nova live oil	9.56 mol% C ₂₊	96	62.8 ^e	—	—	74.3 ^h	56.2 ⁱ	18.3	—
6	Terra Nova live oil	21.4 mol% C ₂₊	96	57.8 ^e	—	—	67.8 ^h	54.8 ⁱ	17.3	—
7	Terra Nova live oil	29.4 mol% C ₂₊	96	31.8 ^e	—	—	35.0 ^h	44.4 ⁱ	10.1	—
8	Terra Nova live oil	32.3 mol% C ₂₊	96	30.0 ^e	29.3 ^e	35.9–36.2 ^e	—	36.0 ⁱ	—	—2.3
9	Gilwood stock tank oil	Ethane	60	7.5 ^e	7.2 ^d	—	—	—	—	—4.0
10	Gilwood stock tank oil	Propane	60	2.82 ^e	3.1 ^d	—	—	—	—	9.9
11	<i>n</i> -decane	CO ₂	38	8.0 ^a	8.7 ^c	8.9 ^c	—	7.6 ^j	—	8.7
12	Live decane	CO ₂	71	12.25 ^a	11.7 ^f	—	11.7 ^g	13.4 ^j	—4.5	—4.5

^a indicates the VIT miscibilities measured in this study.

^b The relatively large deviations observed between slimtube and VIT for RKR STO are because of high asphaltenic nature of this crude oil.

^c Elsharkawy et al. 1996

^d Rao 1997

^e Rao and Lee 2003

^f Metcalfe and Yarborough 1979

^g Monroe et al. 1990; Orr et al. 1993

^h Esmaelizadeh and Roshanfekar 2006

ⁱ Ayirala et al. 2003

^j Ayirala and Rao 2007

Table I-8—Comparison of VIT miscibilities with other experimental techniques and calculation approaches.

APPENDIX J: BOOKS STYLE

Section J-1: Formatting

J-1.1. Textbook Heading Styles.

For book chapters, number only Headings 1 and 2 (e.g., 4.1 for Heading 1; 4.1.1 for Heading 2):

- Heading Level 1—Arial, 12 point, boldface, no run-in, no period. The first paragraph following a Heading Level 1 is flush left (no indent)
- Heading Level 2—Times New Roman, 12 point, boldface, run-in with period, flush left
- Heading Level 3—Times New Roman, 12 point, boldface, italic, run-in with period, indented
- Heading Level 4—Times New Roman, 12 point, italic, run-in with period, indented
- Heading Level 5—Times New Roman, 12 point, run-in with period, indented

J-1.2. Textbook Example/Problem Styles and Other Issues.

- In book chapters, apply a border above the first line and below the last line of examples and corresponding solutions to set them apart from the rest of the text.

Example 1.1—Title of Example. Times New Roman, 12 point, boldface, run-in with period, flush left.

Solution. Times New Roman, 12 point, boldface, italic, run-in with period, indented.

- Number and introduce problems at the end of a chapter using a Heading Level 1 style.

Problems

1.1 Times New Roman, 12 point bold numbers, hanging indent, run-in with text. Text here, text here, text here. Text here, text here, text here. Text here, text here, text here. Text here, text here, text here.

1.2 Text here, text here, text here. Text here, text here, text here. Text here, text here, text here. Text here, text here, text here.

- Submit all figures and tables in separate documents (one for figures and one for tables), rather than embedding them in the text.

- Provide a Foreword and any acknowledgments that should be included.
- Include references in a single list at the end of the book; if the book has multiple contributors (i.e., a different author for each chapter), include references at the end of each chapter.

Section J-2: Abbreviations and Acronyms

J-2.1. Abbreviations.

Spell out abbreviations in the table of contents, chapter titles, and section headings.

J-2.2. Acronyms.

- Define acronyms when they first appear in each chapter.
- If an acronym (e.g., WOR or ROP) is used in an equation and cannot be replaced with a one-kernel symbol, italicize the acronym in the equation but not in a subscript or the text.

Section J-3: Attribution

J-3.1. Attribution for Modified Figures and Tables.

When using a figure or table that belongs to another copyright holder, and when that figure or table is changed in some way from its original appearance, the caption will include a citation that uses the word “after.”

Examples: Fig. 1.1—Pressurized mud balance (after Smith 1991).

Fig. 1.2—Cable-tool rig schematic. After Brantley (1940).

J-3.2. Attribution for Redrawn Figures and Tables.

- When an author wants to use a figure of a nonspecific industry-understood object such as a drillstring, and they provide a drawing of a drillstring from a journal rather than drawing one of their own, we can avoid the time-consuming effort of requesting permission and have it redrawn instead.
- Redrawn figures and tables do not use the phrase “after” in their captions; they do not need to cite a source.
- “Modified” is a word used in correspondence with another copyright owner when requesting permission to republish their figure or table with changes. Modified is not a word used in the figure or table caption.

J-3.3. Attribution for Republished Figures.

- If the figure or table is produced exactly as it appears in the original source, cite the source using the author and year format [e.g., Fig. 1.3—Steam engine (Brantley 1971)].
- Use “courtesy of” or “reprinted by permission from” for material that is directly provided by a company or individual (e.g., Fig. 1.15—Typical fixed-platform structure. Courtesy of Petrobras).
- If the figure is fair use or does not require permission, still cite the source (author year).